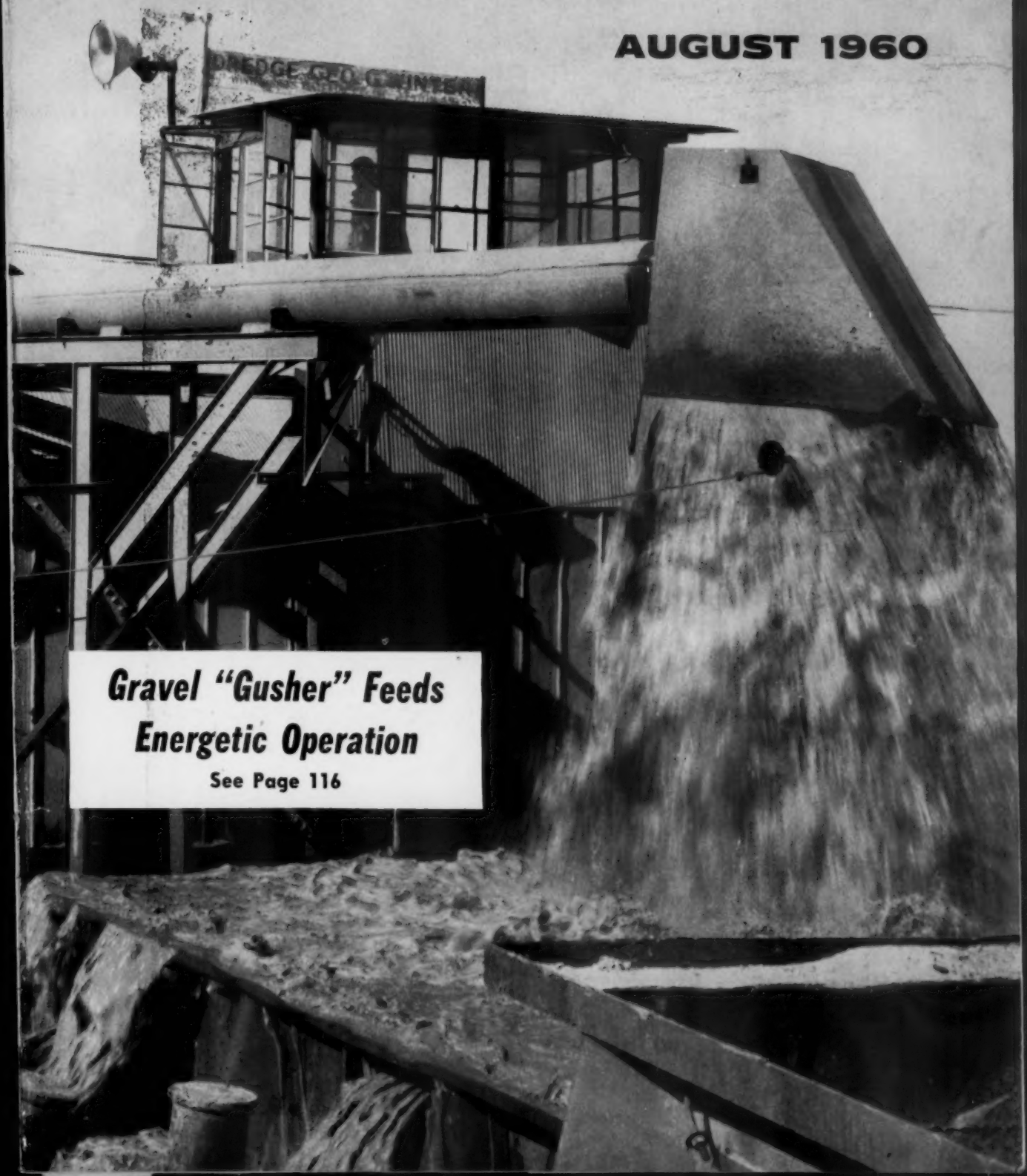
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

AUGUST 1960



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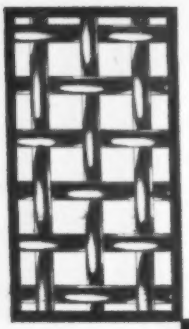

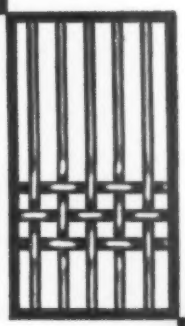

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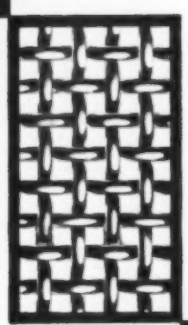

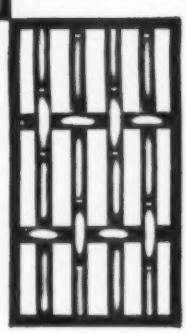

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NBP BPA

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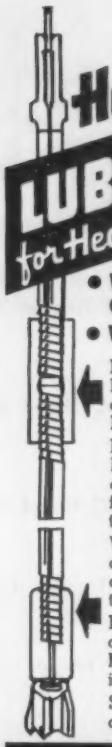

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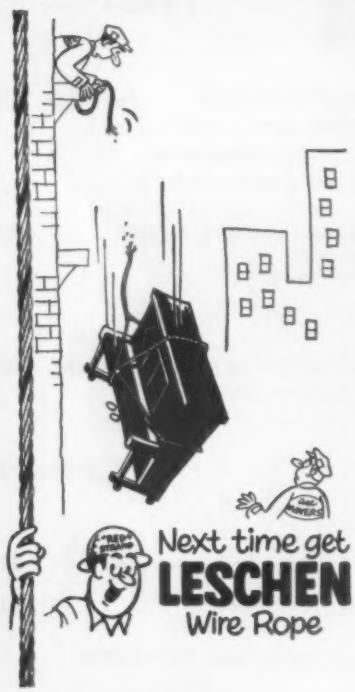

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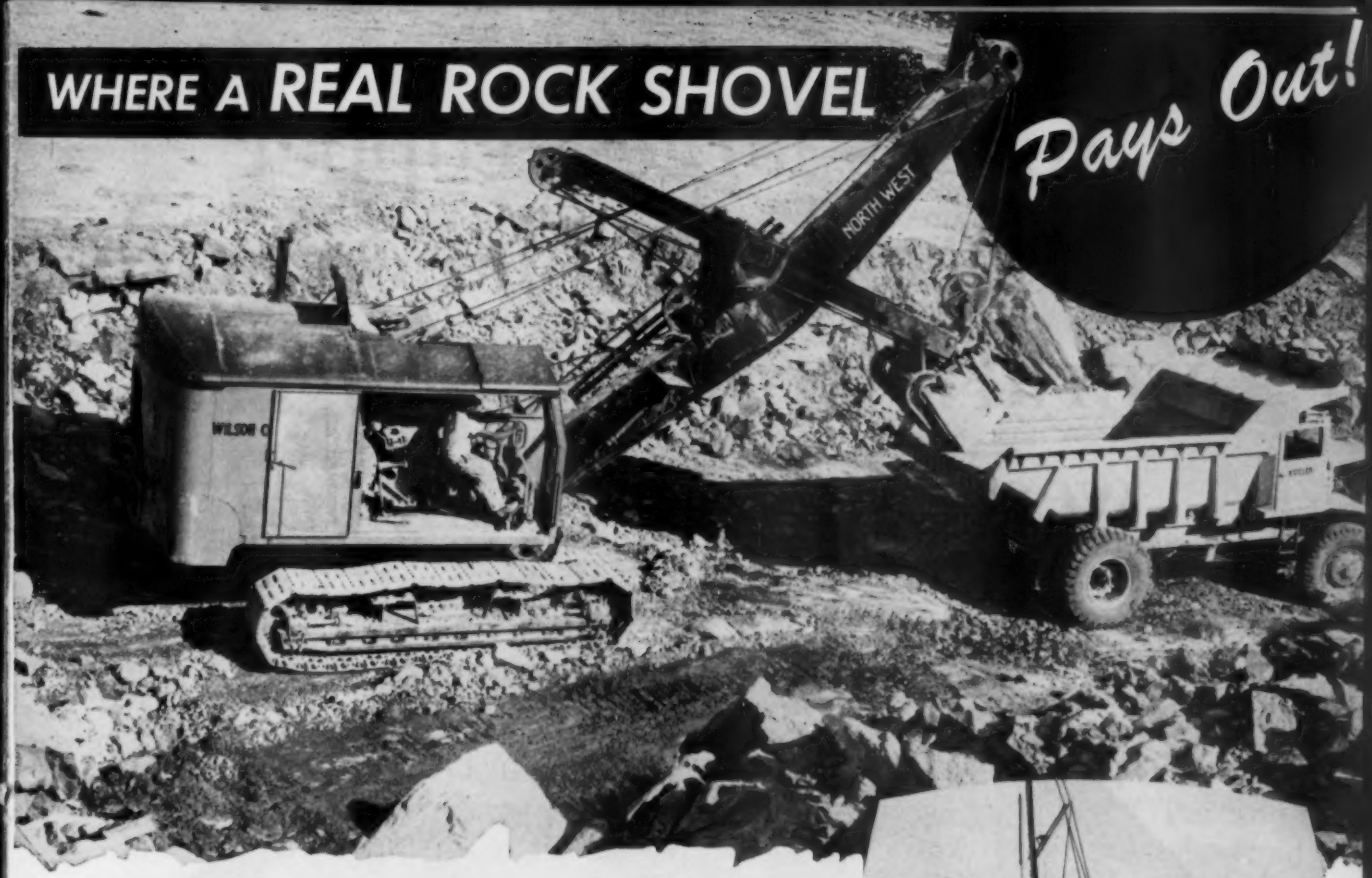
WHERE A REAL ROCK SHOVEL Pays Out!



HERE'S another of the many Northwests that have gone into quarries below the Mason-Dixon Line. Here's a Northwest Model 6 getting sizable yardage for the Wilson County Rock Products Company at Lebanon, Tennessee.

A *real* Rock Shovel pays out on jobs like this. Shovel output is not measured by the speed of a hoist rope or the number of swings per minute! Production is the result of steady month-in, month-out operation. Northwests get the job done—not for the day—but for the week—the month—year-in and year-out.

Northwest design—rugged Cast Alloy Steel Machinery Bases and Machinery Side Frames that eliminate constant rebuilding; Uniform Pressure Swing Clutches, cool-running, jerk-free; the Feather-Touch Clutch Control with its *true* feel of the load; power plants are properly engineered for high altitude conditions, a Crowd that brings extra digging force to handling rock and many other Northwest advantages combine to give smoother control, greater digging power and longer, trouble-free service.

Your Northwest is always ready to go. If you are considering adding to your equipment it will pay you to bring yourself up-to-date on Northwest's latest advantages.

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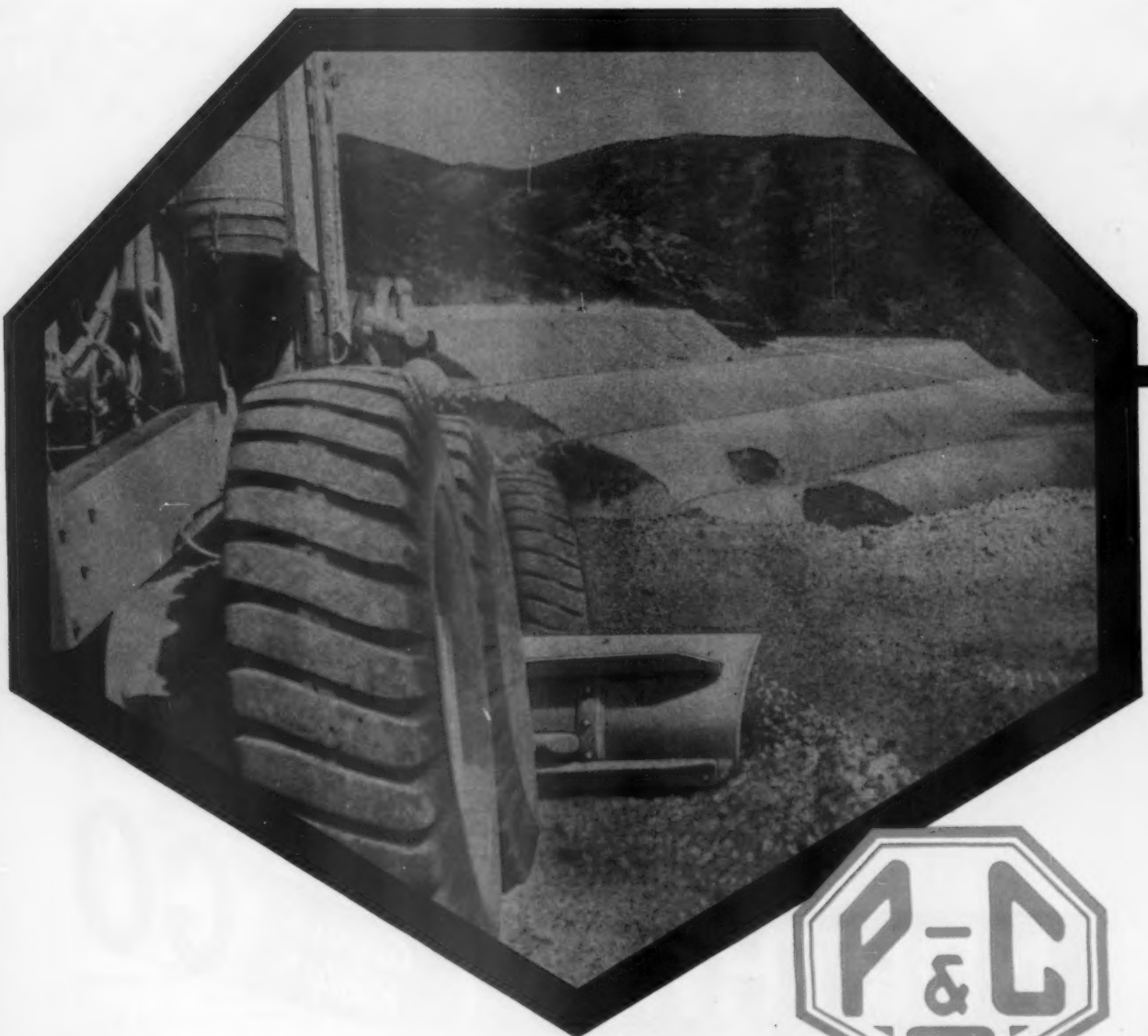
SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

World's largest copper mine speeds production with world's strongest, longest wearing grader blades



P&C

PACAL X-TRA EDGE BLADES

The new Pacal X-Tra Edge Blades wear two and a half times longer than any blades previously used by Western Contracting in mining development work for Kennecott Copper Corp., Bingham Canyon, Utah.

Pacal X-Tra Edge Blades are heavier, stronger . . . wear longer . . . stay sharper . . . offer less waste per hour of work. The steel in Pacal Blades is rolled to an exact analysis. The correct amount of each element is included to give you the best combination of wear and strength. Pacal X-Tra Edge and "Dig-in" End Blades give you more steel on the wearing edge and reduced waste and down time. Write or CALL PACAL!

Pacal Heat Treated Plow Bolts will not loosen or stretch. Heads will not wear off. This extra strength and longer life is necessary when long wearing Pacal X-Tra Edge Blades are used.

Western Contracting use ⅜" to ⅝" x 8" Pacal X-Tra Edge Blades. Outwears ordinary blades up to 6 times.

Available in ½" to ¼" x 8". Either size can be used in two or three piece arrangement.

Pacal Dig-In End Blades work easier, wear longer, cut costs in dozer operations.

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Circular B-82

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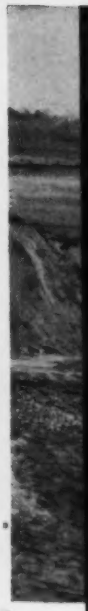
This PAYLOADER® RETIRED THREE MACHINES AT REEVES SAND & GRAVEL

Dozing about 1400 tons of raw gravel to the conveyor each day is a part-time job for the "PAYLOADER" — formerly a full-time job for a track-type bulldozer.



"The best money-maker we have ever used,"

says Melford Reeves

Reeves' operations consist of a large sand and gravel pit and a ready-mix plant. How a Model H-70 "PAYLOADER" has improved the efficiency of their pit is best told by the owner in his own words.

Melford Reeves says, "I selected the H-70 to load trucks from the stockpiles and the raw gravel scattered around the pit after a thorough test of two other machines. The H-70 was faster, had more power and better traction and its construction appealed to me. It was obviously built for heavy work and the strong lifting arms on a pivot below the operator's position would never cause an injury.

"Now after 6 months' experience, our entire operation centers around the 'PAYLOADER' which has proven the best money making machine we have ever used. We first retired the two power shovels that loaded the haul trucks—then almost by accident we discovered it could handle the dozing into the big conveyor hopper better than the tractor dozer did and still have time for its usual truck loading. On a typical day it may push 1400 tons of raw gravel into the conveyor—load out a fleet of trucks at the rate of 12 yd. load in 3½ minutes, plus chores like towing equipment and cleaning up the haul roads."

If you are not yet a "PAYLOADER" user the chances are that it will pay you to see your Hough Distributor. He has a size and model in the complete proven "PAYLOADER" line—from 2,000 to 12,000 lb. operating capacity—to fit your production needs. He also has the most complete service-parts facilities, backed by factory service personnel, to keep your "PAYLOADER" investment profitable.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

The H-70 has an operating capacity of 7,000 lbs. It is one of 10 proven "PAYLOADER" sizes—up to 12,000 lbs. capacity—available for any size job in the pit or around a plant.

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Send literature on the complete "PAYLOADER" line.

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NEW!

WEST VIRGINIA'S 1960 STANDARD BAG CONSTRUCTIONS TO SAVE YOU MONEY

Substantial savings for cement companies are achieved by two new standard WONDERWALL bag constructions perfected by West Virginia for packing Portland cement.

During a controlled test to determine possible savings in bag costs, various WONDERWALL constructions were developed in our Multiwall Packaging Laboratory. They were tested by 24 plants which shipped 1,118,415 barrels of cement in 5,282,966 WONDERWALL bags.

Result of this laboratory and field proving was the development of the superior "Optimum" and "Economy" bags for packing Portland cement. The new constructions are shown in the box.

The new 3-ply Economy WONDERWALL *is tougher than the 4-ply natural kraft multiwalls in all respects, and offers a cash saving of $2.75 per M in bag cost.*

The 3-ply Optimum WONDERWALL gives far better performance than the heavier 4-ply kraft multiwall, both in the mill and in transit. Whereas natural kraft breakage ran as high as 5% in truck shipments, the WONDERWALL Optimum bag reduced it to less than 1%. Breakage in rail shipments dropped from 6 to 10 bags per car to 1 or 2 maximum. The reduction in bag breakage alone provides a realistic cash saving, to say nothing of improved customer and employee satisfaction.

Secret of WONDERWALL strength is Kraftsman Clupak* extensible paper. Its built-in stretch withstands far more impact without breaking than conventional natural kraft. In a WONDERWALL bag, fewer plies are needed to do the job!

See how WONDERWALL standard bag constructions can cut your costs, increase your profits. Our technical service experts are ready to help you take full advantage of these new bag developments; call or write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N.Y.

Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.

NEW STANDARD WONDERWALL CEMENT BAG CONSTRUCTIONS

Pounds Packed	Old Style Natural Kraft Construction	Optimum Wonderwall	User Benefit
94#	3/40, 1/50	3/50	less breakage

	Economy Wonderwall	
94#	3/40, 1/50	1/50, 1/40, 1/50	$2.75/M and less breakage

WONDERWALL bags of the "Optimum" construction have reduced breakage at the North American Cement Corporation's Security, Maryland, plant.

West Virginia Pulp and Paper

Washington News Letter

By S. HERBERT UNTERBERGER

Legislation and the Election

WHEN Congress went home for the 4th of July holiday and the nominating conventions, it left a thoroughly untidy situation in Washington. Of special significance is the fact that virtually all of the unfinished business, which Congress postponed until after the conventions, had extremely high vote-alienating possibilities. This is particularly true of the minimum wage legislation, the aid to education legislation, and the old-age medical care programs. Each of these has the backing of lobbies which, while they may not be the wealthiest in Washington, represent extraordinarily large blocks of voters.

The supporters of improved minimum wage legislation make up what is probably the most powerful lobby. This includes not only practically all of the 15 million trade unionists but also the overwhelming proportion of unorganized workers. Behind the aid to education measures are most of the professional teachers' association, but also and perhaps more importantly, the large number of parents, many of whom are members of parent-teachers associations, and others who just want their children to go to better schools. Finally, those behind further old age assistance for medical care include not only the older people themselves but also a large proportion of their children who would, through this legislation, be relieved of an actual or potential financial obligation.

In what appears will be a close election, the fate of these pieces of legislation may determine the outcome. Generally, it is being said in Washington that the post-convention session of Congress will be most costly to the Republicans. This is not only because a larger proportion of the Republican Senators and Congressmen are opposed to these bills but also because it will tie down Vice-President Nixon during very critical campaigning weeks. As presiding officer of the Senate, he is in a rather obscure position. The only time that he achieves any substantial prominence is if he is called upon to break a tie vote. But, when this happens, he is completely on the spot and, generally, whatever action he takes becomes subject to severe criticism.

On the other hand, the Democrats will be prominently involved in the passage of the legislation and can be expected to be in there making the most flamboyant of speeches with respect to it.

Finally, there is a very substantial possibility that the kind of bills which *will* pass will be so extreme that they will be unacceptable to the President who will, therefore, feel that he is required to veto them regardless of the political repercussions.

IT IS BEING SAID in Washington that while the President was never very much of a party-line Republican, he has, in recent months, become even less so. In these final months of his administration, he appears to be far more concerned with the mark which it will leave on history rather than with the question of whether his actions will help or hinder the continuation of Republicans in office.

On no other basis is it possible to explain his veto of the Federal Employees' increase bill in the face of the certainty that his veto would be overridden. It is clear now that his Administration, at least subsequent to the death of Secretary of State Dulles, will not be known for its brilliant success in the handling of foreign affairs. If the President's own method of personal diplomacy had not come a cropper in the Far East, this might have served as the hallmark of the Eisenhower Administration. However, now that it is coming to an end with foreign affairs in a state of serious uncertainty, it is necessary to rely on the handling of domestic affairs as the basis for establishing a record.

In this connection, the keystone of the Eisenhower policy has been the fight against inflation and unnecessary government expenditures. If this continues to be the heart of the policy, there is some real danger of veto or even of veto talk. The latter may be almost as damaging as outright veto, principally because of what the public relations people call the "public image" which is constructed. If the Republicans hope to win in November, this is hardly the time for them to construct a public image of being desperately against higher wages, better education, and aid to help the aged pay their medical bills.

The State of the Economy

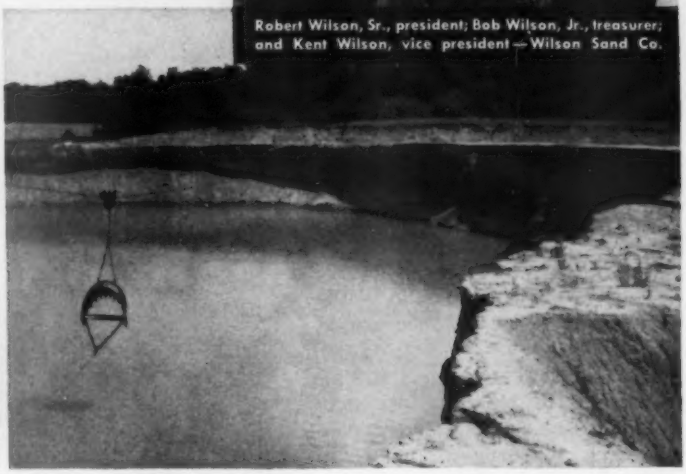
Since so little can be done between now and November to change the posture in foreign affairs, it is generally expected that every measure will be taken to make sure that our domestic situation is as untroubled as possible at least during the campaign period. This is no simple task, particularly in view of the fact that the expected 1960 boom has not really developed. The possibility of generating increased economic activity is also rather limited in this short period of time.

(*Concluded on page 77*)

Sauerman DragScraper Digs and Hauls from Pit to Hopper for 8¢ Per Yard

Robert Wilson, Sr., president; Bob Wilson, Jr., treasurer; and Kent Wilson, vice president—Wilson Sand Co.

Track Cable DragScraper inhauling load to hopper from 40 ft. below water.



DragScraper and carrier returning to pit by gravity. Average haul is 500 ft. on a 675-ft. span.

Operating costs for Wilson Sand Co.'s new Sauerman DragScraper are estimated to be less than 8 cents per yd. This includes labor, maintenance and power costs to dig from 40 ft. below water level and deliver 90 yds. per hr. to the field hopper on an average haul of 500 ft.

Wilson Sand Co.'s new 125-tph. plant represents a steady increase in capacity which started with 20 tph. in 1939, using a small Sauerman Slackline.

Sauerman equipment has kept pace with the growth of their Upper Sandusky, Ohio plant. The Slackline was replaced by a 1½-yd. track cable DragScraper in 1951, and with a 2-yd. machine in 1953. The new Sauerman unit is a 3-yd. track cable DragScraper operated by a two-drum electric hoist equipped with air controls.

The DragScraper is digging 35 to 45 ft. under water down to bed rock on a 675-ft. span. The pit bank stands 40 ft. above the water, thus total depth of the deposit recovered by the DragScraper is about 85 ft.

Excellent material and the right equipment to dig and process are responsible for the continued growth of the Wilson Sand Co. Officers of the company are Robert W. Wilson, Sr., President, Kent Wilson, Vice President and Bob Wilson, Jr., Treasurer.

You can cut *your* costs by digging and hauling with a Sauerman Machine sized to match your plant capacity. Track cable Drag-Scrapers dig from high banks, dry pits and deep water. They are built in sizes up to 15 yds. and operate economically on 1000-ft. spans. Start reducing your operating costs—write or call and tell us your job requirements.

After discharging load into field hopper, DragScraper is lifted from pile for return to pit. Conveyor at left loads to plant.

This Sauerman two-drum hoist controls operation of DragScraper.

SAUERMAN BROS., INC. 634 SO. 28th AVE. BELLWOOD, ILL.

Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks

Labor Developments

New Status for Arbitration

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

AN overwhelming proportion of labor agreements include a grievance procedure which provides for reference of an unsettled dispute between parties to an impartial arbitrator whose decision is final and binding. Under some agreements, virtually any dispute which occurs during its term is subject to the grievance procedure and to final arbitration. In others, there are limitations on the kind of disputes which may be taken through the grievance procedure and also on the kind which must be taken to arbitration. Accordingly, in many cases before their merits may be considered in arbitration, a preliminary question is raised as to whether the matter *is* arbitrable. Since practically all grievances originate from the employees, it is the employers who, generally, raise the question of arbitrability.

When they raise this question, they have a choice. They may either present the question of arbitrability to the arbitrator for his decision or they may refuse to go before an arbitrator at all on the ground that, under the contract, they are not required to do this. When they so refuse, if the union wishes to prosecute its grievance it has no alternative but to go to the courts in an effort to get them to require the employer to go to arbitration. In this way, a number of cases have come before the courts and, as is usual in such situations, different courts have rendered widely different decisions. It is of great concern that some courts have shown a tendency to go into all of the merits of the case when considering the question of arbitrability.

The courts have also had to deal with arbitration when one of the parties refuses to fulfill the arbitrator's award and the courts must be appealed to for enforcement. In these instances, also, a number of courts have acted in a variety of ways so that the status of the law was uncertain.

BECAUSE OF this general uncertainty, the U. S. Supreme Court reexamined the question of enforcement of the labor agreement provisions dealing with arbitration. In three recent decisions, issued on the same day, the Supreme Court reaffirmed very strongly the principle that courts *may not examine* the merits of grievances to determine *either* arbitrability *or* the validity of arbitration awards. All three cases were brought by the United Steel Workers of America. Two were concerned with the enforcement of an arbitration award.

In the first of these, the labor agreement had both a "no strike" and a "no lock-out" provision. It also had a grievance procedure which provided, in its relevant part, as follows:

"Issues which conflict with any Federal statute in its application as established by court procedure or matters which are strictly a function of management shall not be subject to arbitration under this section."

Thereafter, it included the usual provision for arbitration if agreement has not been reached during the preceding stages of the grievance procedure.

In a case involving the contracting out of certain work, the employer refused to go to arbitration. A suit was entered by the union to compel him to do that. Both the District Court and the Court of Appeals supported the employer's position on the ground that the issue, contracting out, was strictly a function of management and, therefore, not limited in any respect by the labor agreement. The Supreme Court reversed this decision.

In coming to this conclusion, the high court enunciated a doctrine which narrows the usual conception of management rights. It interpreted the words "strictly a function of management" as referring only to that over which the contract gives management complete control and unfettered discretion. Only if the agreement specifically excluded contracting out from the grievance procedure would the Supreme Court have regarded it as a matter which could not be arbitrated. The Supreme Court went on to say:

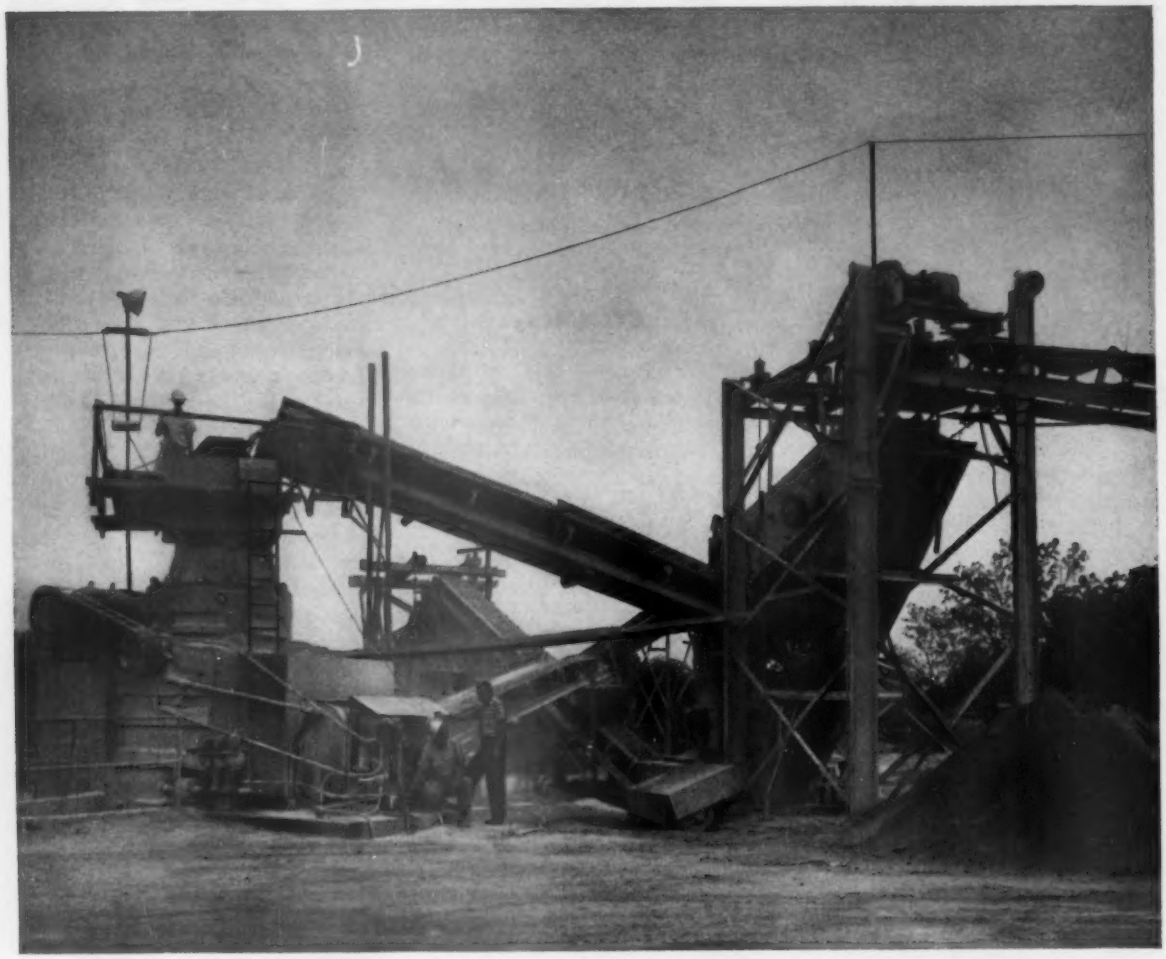
"In the absence of any express provision excluding a particular grievance from arbitration, we think only the most forceful evidence of a purpose to exclude the claim from arbitartion can prevail, particularly where, as here, the exclusion clause is vague and the arbitration clause is broad. Since any attempt by a court to infer such a purpose necessarily comprehends the merits, the court should view with suspicion an attempt to persuade it to become entangled in the construction of the substantive provisions of a labor agreement, even through the back door of interpreting the arbitration clause, when the alternative is to utilize the services of an arbitrator.

"The grievance alleged that contracting out was a violation of the collective bargaining agreement. There was, therefore, a dispute 'as to the meaning and application of the provisions of the Agreement'

(*Concluded on page 77*)

ALLIS-CHALMERS

A-1345



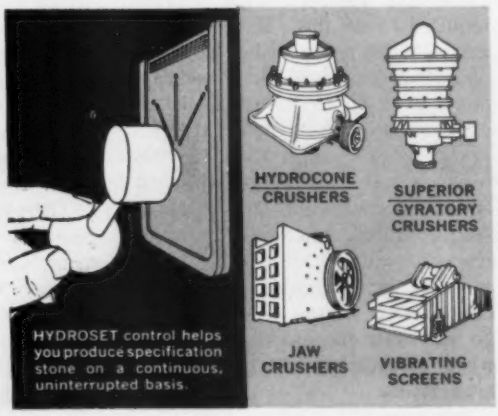
Small switch brings big profits

with Hydroset-controlled crushers paying extra dividends

A shift in the crushed-stone market from 2½" topsize stone to 1" x 0 fines posed a problem for Aggregate Limestone Company, Trussville, Alabama.

To make the switch in production, they installed a 1051 *Hydrocone* crusher as a secondary unit, converted the existing *Hydrocone* secondary to third-stage crushing. This modest investment boosted production 60%, at the same time producing a more salable product.

And Aggregate Limestone Co. won't get caught with the wrong product size again. Their *Hydrocone* crushers are equipped with *Hydroset* control — providing easy adjustment for wear and quick change of product size, as often as necessary and on a minute's notice. Ask your A-C representative about the rugged dependability of *Hydrocone* crushers for reduction — and the product flexibility you get with *Hydroset* control. Or write **Allis-Chalmers,** Industrial Equipment Division, Milwaukee 1, Wisconsin.


HYDROSET control helps you produce specification stone on a continuous, uninterrupted basis.
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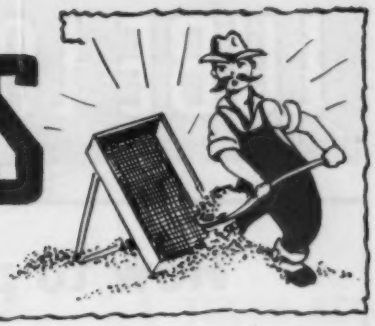
SCREENINGS



By RAY L. SMITH JR.

'TIS SAID a man is only as old as he feels, and today that makes us a gay 100.

Thanks to the few lads (and lassies?) who read this column, we have a small stockpile of things which have caught their fancy.

An oldtimer was telling recently about an important moment of his life:

"I remember the first pair of dollar pants my folks bought me.

"I was really something. Most of the pants at that time were either 35 or 50 cents.

"But my mother bought these and they were $1.

"They were short pants, of course."

The things that can happen to a man in one night.

Take Ingemar Johansson for instance. The Swedish playboy took one night off from nightclubbing to earn a little of the American long-green with the short future.

And wham!

Most of the former heavy weight champions with the exception of Joe Louis figured Ingo was in for a tea party.

Instead, Floyd spread out the Swedish bread basket—terrible right hand and all—like a smorgasbord.

Here, this Ingo, was an unknown face yesterday. He was a small town boy from Sweden, a land known for beautiful women not ring champions.

Less than a year ago within the space of three minutes he became a man of the world, a movie star, a national attraction, this boy with good, all-American-type looks.

But, if the road up was fast, the flight back down was fantastic.

In just 90 seconds his face had become just another in the crowd . . . a falling star . . . a statistic in the record books of boxing.

Things we'd like to see:

A movie without cursing . . . a grocery bag boy who would place the canned goods at the bottom of the bag instead of the bread . . . a chocolate pie dropped into an electric fan . . . an I-less politician . . . two-bit dinners (and haircuts) . . . a love of labor . . . a day's news without presidential campaigning . . . a non-expert in the field of sports, politics and religion . . . Dick Tracy get his . . . the Yankees in eighth place . . . a woman who could remain quiet for five minutes (out of every ten) . . .

That last gives us something to think about.

This year—for the first time in the history of our country—more women than men will go to the polls.

Women voters outnumber men voters at one of the most critical periods in all history, at a time when the best possible candidates need to be elected.

Could be a step in the right direction. More qualified women in office might, in time, result in more qualified and dedicated men seeking office.

Potpourri and Succotash

A fellow who had had one too many was driving the wrong way on a one-way street and was hailed by a cop who rasped, "Hey, didn't you see the arrows?"

"Honest, Offisher," gurgled the driver, "I didn't even see the Indians!"

Model: "If I didn't wear all these beautiful clothes would you still be attracted to me?"

Boy friend: "Test me."

The lanky cowboy strode into the elegant ladies shop and headed for the lingerie department. He approached the salesgirl and announced, "I'd like to buy a girdle, ma'am."

"Playtex?" she suggested.

"That's mighty kind of you, ma'am," the cowboy gallantly answered, "but not right now. I'm double parked."

Judge: "Now, Sir, you may, if you wish, challenge any member of the Jury."

Prisoner: "Well, I'm not in very good condition, but I believe I can lick that little guy in the end seat."

Northern Co-ed. "Men are all alike."

Southern Belle: "Men are all ah like, too."

We never used to be able to find Grandmother's glasses, but now she leaves them right where she empties them.

Two young guys were discussing their conquests and the first young man reminisced rapturously about one of his former girl friends, mentioning that she was a twin. "Twins?" his buddy queried. "How did you tell them apart?"

"Oh, that wasn't so hard. Her brother has a mustache!"

A Broadway playboy decided to reform. The first week he cut out cigarettes. The second week he cut out booze. The third week he cut out dames. And the fourth week, he cut out paper dolls.

LUBE LOGIC Tips for more

How to put engines in mothballs

As hard as you try to keep all your equipment at work all the time, invariably there'll be times when you just have to prepare a piece of motorized equipment for an idle stretch. Long idle periods can take a heavy toll on an unprotected engine. These eleven steps assure you that the engine will be in as good condition when you start it up again as it was when you put it away.

1 Run the engine for a while and drain the oil while it's hot. Install new filter element.

2 In mild climate, drain and flush cooling system and refill with rust-inhibited water solution. In subfreezing climate, drain, flush and refill with rust- and corrosion-inhibited anti-freeze.

3 Refill crankcase with Texaco Ursa Oil Heavy Duty, idle the engine fast for about 20 minutes, and shut it down. For diesel engines, add 3% Ursa Oil Heavy Duty (of correct seasonal grade) to the fuel before this idling period, and afterward fill the tank with a good diesel fuel.

4 Remove spark plugs and squirt a little Ursa Oil Heavy Duty into spark-plug holes while engine is being turned over. Dip plug electrodes in Ursa and replace.

5 Coat each lobe of distributor breaker cam with Texaco Rustproof Compound L. Replace distributor cap and seal breather hole in cap with waterproof tape.

6 On ohv engines, remove valve cover and squirt Ursa Oil Heavy Duty on rocker mechanism, interior of valve cover, and between cylinder block and side plate cover.

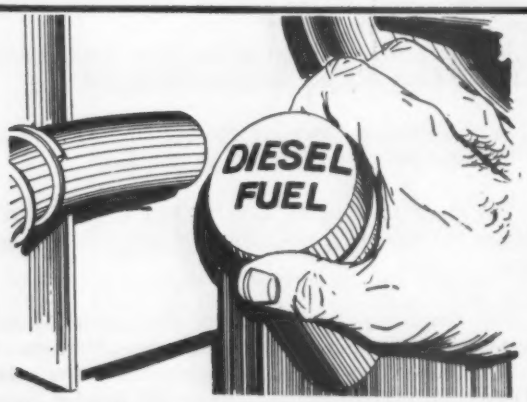
7 On gasoline engines, drain fuel tank, lines, pump, strainer and carburetor. Afterward, close all openings and reconnect all fittings.

8 Remove battery, store it in cool dry place, keep water level up. Recharge periodically. Apply Texaco Rustproof Compound L to battery terminals, leads and container. Loosen fan belt; insert paper between belt and sheaves.

9 Clean and dry outside of engine. Touch up unpainted spots with Texaco Rustproof Compound L.

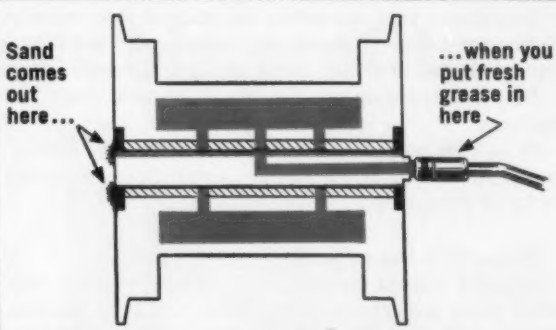
10 Seal engine air intake, breathers, exhaust and exhaust expansion joints with waterproof tape or heavy paper secured with waterproof tape.

11 Tag engine and engine parts with detailed information on rustproof measures taken.



Identify the fuel you want

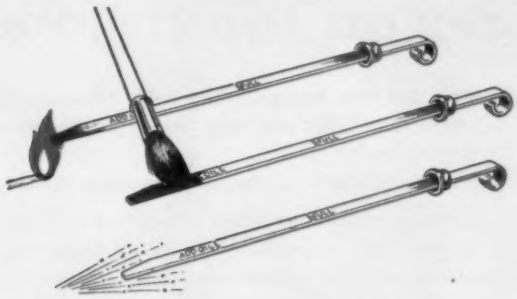
Let one absent-minded maintenance man put gasoline in your diesel tank and as the fliers say you'll be "bailing out over Denver." It's happened. Best way to avoid its happening to *you* is to mark your fill cap; "Diesel Fuel" or "Gasoline." Then nobody should make any mistakes.



Track-roll enemy No. 1: sand

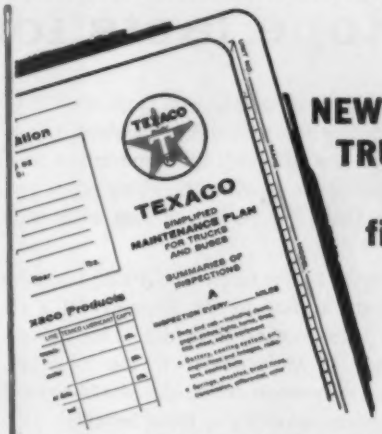
If you're operating a crawler-tractor in sandy soil, the best way to keep sand from getting into the track-roll bearings is to keep purging the bearings with fresh grease. Most track-roll bearing seals are especially designed for this type of purge-lubrication, and the grease that comes out around the edges of the seal during lubrication carries the sand out with it.

efficient maintenance



How to read dipsticks without squinting

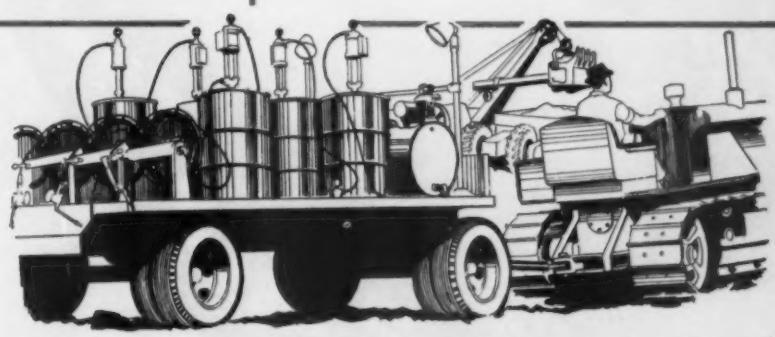
The modern inhibited motor oil that keeps the inside of your engine clean also keeps the oil dipstick clean—and often too shiny to read. Here are three solutions for this problem—take your choice. 1. Heat the end of the dipstick so that the metal darkens slightly. 2. Paint the end of the stick with a dull-finish cellulose lacquer. 3. Run the stick across the spark-plug cleaner to take off some of the shine. (If you use the spark plug cleaner, use the smallest rubber plug bushing and hold the dipstick over the hole with a wad of cloth to keep sand from scattering around the lube box.)



NEW TRUCK RECORD FOLDER fits itself into your schedule

Texaco's flexible new truck record folder lets you stick to the lube schedule that works best for you without running into bookkeeping problems. Lubrication and oil schedules are completely separate from mechanical maintenance and replacement parts schedule—you don't have to follow any pre-established routine to use the folder profitably. And this new folder accounts for every single dollar you spend on truck maintenance for a whole year. Get yours now.

Do-it-yourself lube rig trailer



Maybe you're aware of all the advantages of a mobile lube rig, but just don't want to tie up a truck for this purpose. Or, perhaps you'd like a supplementary rig. You can solve either problem neatly by mounting your field lubricating equipment on a standard 5-ton farm trailer. That way, you can take your whole Simplified Lube Plan out into the field where it's needed, without costly deadheading back to a fixed service point—and you can move the lube rig just by hitching it to any truck, so it's just as mobile as a truck-mounted rig at much less cost. And here's a bonus: by hitching your lube rig trailer to a bulldozer, you can take field service to spots that wouldn't be accessible to a regular truck.

Trailers for this purpose, as well as tanks and pumps, are all standard items you assemble yourself to meet your own requirements.

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Every month or so we'll bring you a batch of "sleepers", little angles, so easy to overlook, where big savings in money and time can be made. But month in, month out, your local TLE is the best source of money-saving lubrication ideas. Don't forget that "Lubrication is a major factor in cost control."

Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

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Field Performance Report

Users confirm that DOUBLE GRAY-X® Wire Rope lasts longer on tough jobs

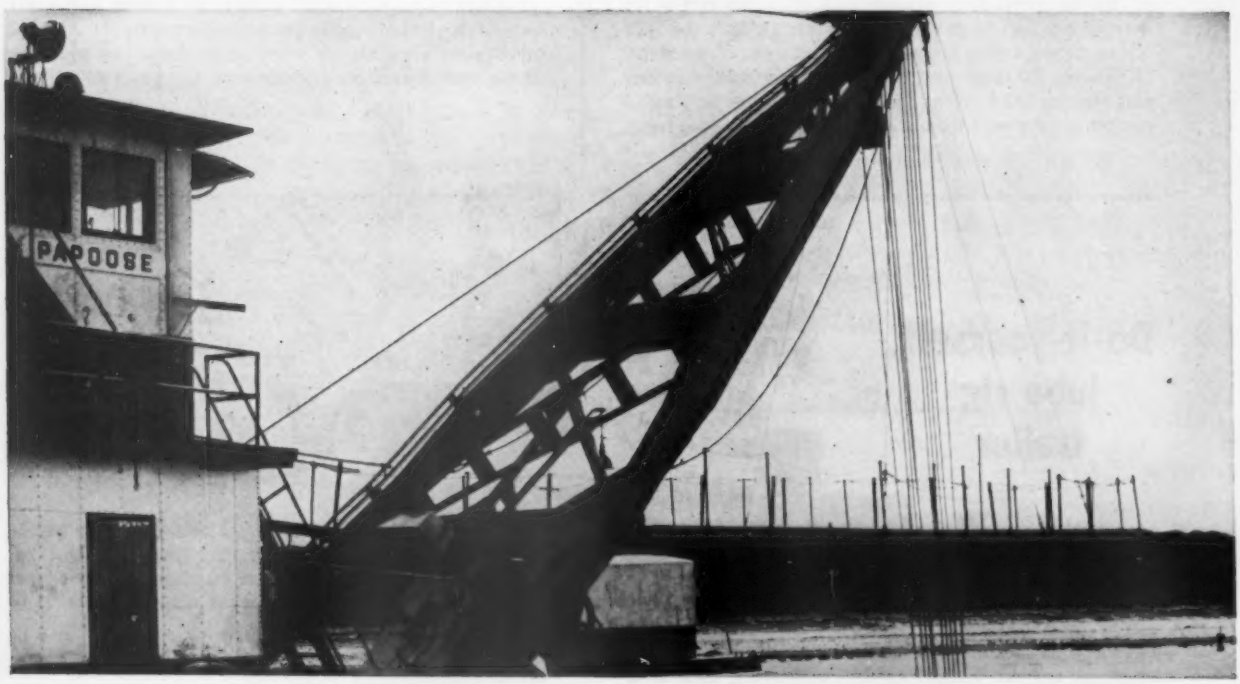
Field reports are now coming through on CF&I-Wickwire's superior new wire rope—Double Gray-X. These reports, a few of which are summarized here, all agree on one point — when the going really gets tough, Double Gray-X lasts longer than other wire ropes.

Double Gray-X is the result of CF&I's intensive research program leading to the discovery of a remarkable new wire-drawing technique. This process includes the use of Molysulfide* in the lubricant, which creates a *permanent molecular shield* around the individual wires, resulting in these benefits:

- **reduced friction between individual wires in every strand of Double Gray-X during service;**
- **smoother wire surface, which helps eliminate the "weak links" that can cause breakage and impair service life;**
- **greater resistance to abrasion, crushing, bending.**

And—in addition to longer life—Double Gray-X gives you extra strength. Made of extra-improved plow steel with an independent wire rope core, this rope gives 15% higher breaking strength than the catalog breaking strength of an improved plow steel rope with IWRC.

Double Gray-X is made in a wide range of sizes and constructions. It's available from CF&I-Wickwire's chain of warehouses and nation-wide network of distributors. For complete details, call the nearest CF&I sales office or a Wickwire Rope distributor.



REPORT: ON THE SACRAMENTO RIVER, two dredges – the *Papoose* and the *San Diego*—are sucking up tons of silt to help make Sacramento a seaport. Both use Double Gray-X for lines on swings, spuds and ladders.

Captain Nick Carlson of the *Papoose* (Hydraulic Dredge Company) says: "The Double Gray-X rope that holds the suction head really takes a beating on both spud and swing lines, but it's still in fine shape. However, another brand of wire rope put in at the same time is beginning to show wear."

Captain Ralph Vea of the *San Diego* (Pacific Dredging Company) reports: "When you're down with rope failure in this business, you're really out of production. But Wickwire Rope, which we have been using for nineteen months, really keeps us going. We used to change swing lines every six weeks, but the Double Gray-X we have on there now has been in service nine weeks already. That new protective shield on the rope really does the job."

*Registered Trademark of Climax Molybdenum Co.

REPORT:

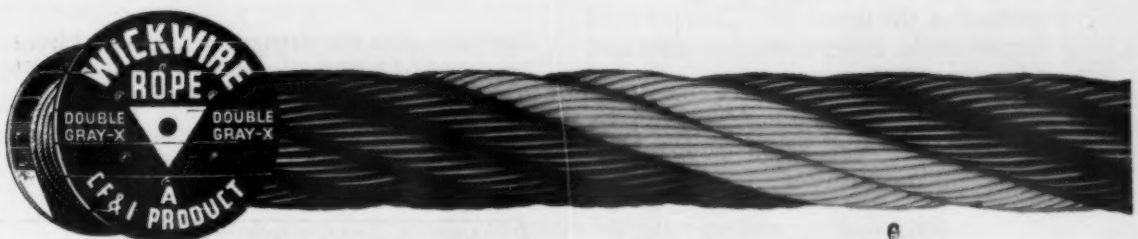
IN THE MOUNTAINS OF COLORADO, the Hopkins Construction Company relied heavily on Double Gray-X on "two of the toughest construction jobs we ever handled." Both required the moving of more than 300,000 cubic yards of material. Many different types of earth-moving equipment, including the power shovel pictured above, were equipped with Double Gray-X — with these results:

President Hopkins: "Every minute of working time counted on the Cheyenne Mountain job because we faced a $5,000-a-day penalty if we didn't finish it in 45 days. The service we got from Double Gray-X was wonderful. We didn't lose 1% of downtime because of rope failure — and we completed the job in exactly 45 days."

Duane Rundle, Project Superintendent on the South St. Vrain Canyon job: "Rope life has been improved and downtime cut drastically since we switched to Double Gray-X. Maintenance is no problem at all. We just grease the rope when needed."

REPORT:

ON ROTARY OIL RIGS of the Falcon Seaboard Drilling Company, a prototype of Double Gray-X underwent tests that put wire rope to the most extreme abuse. Mr. Jack Starr, Vice President in Charge of Drilling, comments: "The results obtained with the original prototype of Double Gray-X led to our decision to order a carload of this improved product. Falcon Seaboard insists on the best products to serve the oil industry in accordance with today's modern standards."



WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION

CF&I STEEL

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In the East: **WICKWIRE SPENCER STEEL DIVISION** — Boston • Buffalo • Chattanooga • Chicago • Detroit Emlenton (Pa.) • New Orleans • New York • Philadelphia

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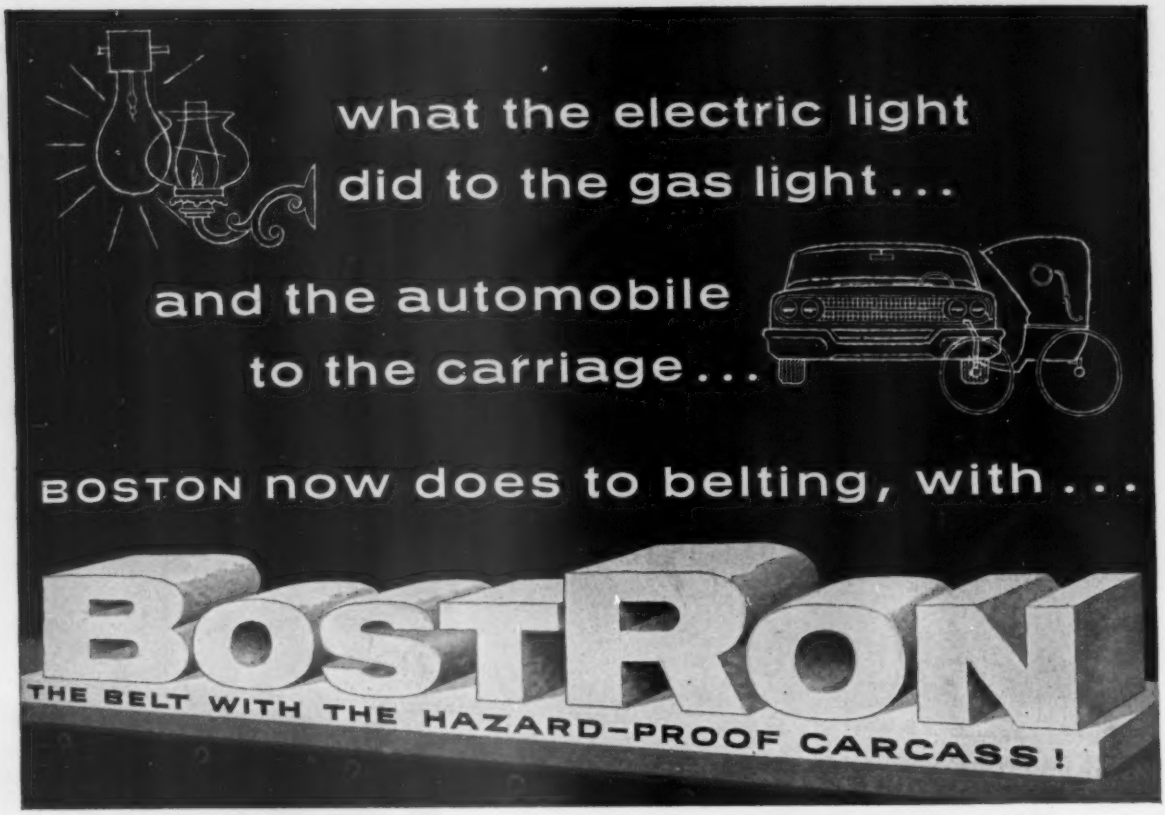
what the electric light
did to the gas light...
and the automobile
to the carriage...
BOSTON now does to belting, with...
BOSTRON
THE BELT WITH THE HAZARD-PROOF CARCASS!

BOSTRON HAZARD-PROOF CARCASS MAKES ORDINARY BELTING OBSOLETE

- BOSTRON Belts will not rot or mildew . . . are completely resistant to the deteriorating effects of moisture.
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- BostRon Belts' amazing carcass flexibility permits troughing up to 45° instead of the usual 20°. This permits larger loads, lower handling costs and narrower conveyor widths.
- BOSTRON Belts are not affected by belt fastener rust, acids or chemicals normally encountered.
- BOSTRON Belts can be thinner and lighter because of their superior strength. Handling, installing and storing are easier. Less headroom is required, and pulley diameters can be reduced up to one-third.
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BOSTRON plies are stronger than steel yet have all the advantages of fabric. New BOSTRON Belts combine a hazard-proof carcass with Balanced Belt Construction and make your investment in a superior Dulon Cover the most sensible and dollar-saving way to purchase belts today!

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Know All Men by these Presents,

that _____

of _____ (hereinafter called Seller),

is held and firmly bound unto _____

of _____ (hereinafter called Buyer)

in the sum of not exceeding the lesser of FIVE THOUSAND DOLLARS ($5,000.00) or Seller's price, with respect to each parts assembly described below, for the payment of which Seller hereby binds itself, its successors and assigns by these presents.

The Condition of this Obligation is such that Whereas Seller has sold to Buyer the below-described parts assembly or assemblies originally manufactured by Caterpillar Tractor Co. and reconditioned in accordance with practices recommended by Caterpillar Tractor Co.:

DESCRIPTION	PART NUMBER	SERIAL NUMBER	SALE PRICE

And Whereas Seller guarantees each said parts assembly against unsatisfactory performance due to defective material or workmanship for _____ days after the date of sale shown below (herein referred to as the guarantee period), the obligation under this guarantee being only to repair or replace, as Seller may elect, any said assembly which proves defective in material or workmanship under conditions of normal use during the guarantee period at Seller's expense (including cost of all necessary materials and labor) up to a maximum of the lesser of Five Thousand Dollars ($5,000.00) or Seller's price, with respect to each said assembly, except that the cost, if any, of transporting each said assembly from and to Seller's place of business shall be paid by the Buyer.

Now, Therefore, if Seller, its successors and assigns shall in all respects well and truly perform the obligation under the guarantee recited above, then this obligation shall be void; otherwise to remain in full force and effect.

THE ABOVE GUARANTEE IS VOID, AND SELLER SHALL BE UNDER NO OBLIGATION THEREUNDER, IF CLAIM IS NOT MADE TO THE SELLER WITHIN THREE (3) DAYS AFTER DISCOVERY OF THE DEFECT UPON WHICH THE CLAIM IS BASED.

You can have complete confidence in any Parts Assembly Exchange or Rebuilt Unit carrying the dealer's new Bonded Buy label. You'll receive a Guarantee Bond, backed by the Lumbermens Mutual Casualty Company of Chicago, Illinois, giving the guarantee conditions agreed upon at time of sale. This is further evidence that a Caterpillar Parts Exchange or Rebuilt Assembly is in first-class condition—another way of expressing the careful and thorough workmanship that goes into each of these reconditioned assemblies.

The cost? It compares favorably with the cost of doing the reconditioning work yourself. Often less . . . because of the availability of special equipment and servicemen's skills in the dealer's shop. Your final net cost is based on parts and labor necessary to put your worn assembly in A-1 condition—same as the exchange unit you receive.

Here's why Cat Reconditioned Assemblies save you money. You trade down time for more *go* time. Simply:

1. **Call your Caterpillar Dealer and arrange for the Parts Assembly you need.**
2. **Remove your worn assembly and install the reconditioned unit.**
3. **Put your machine back to work immediately and return the worn unit to your dealer.**

Any way you look at it, a Bonded Buy Parts Assembly is a good deal. You get a dependable unit . . . guaranteed in writing. The cost is approximately the same had you done the work yourself. Time saved can be converted to cash because your machine's working and earning. Contact your Caterpillar Dealer today. Find out what assemblies he stocks (new items are being added daily).

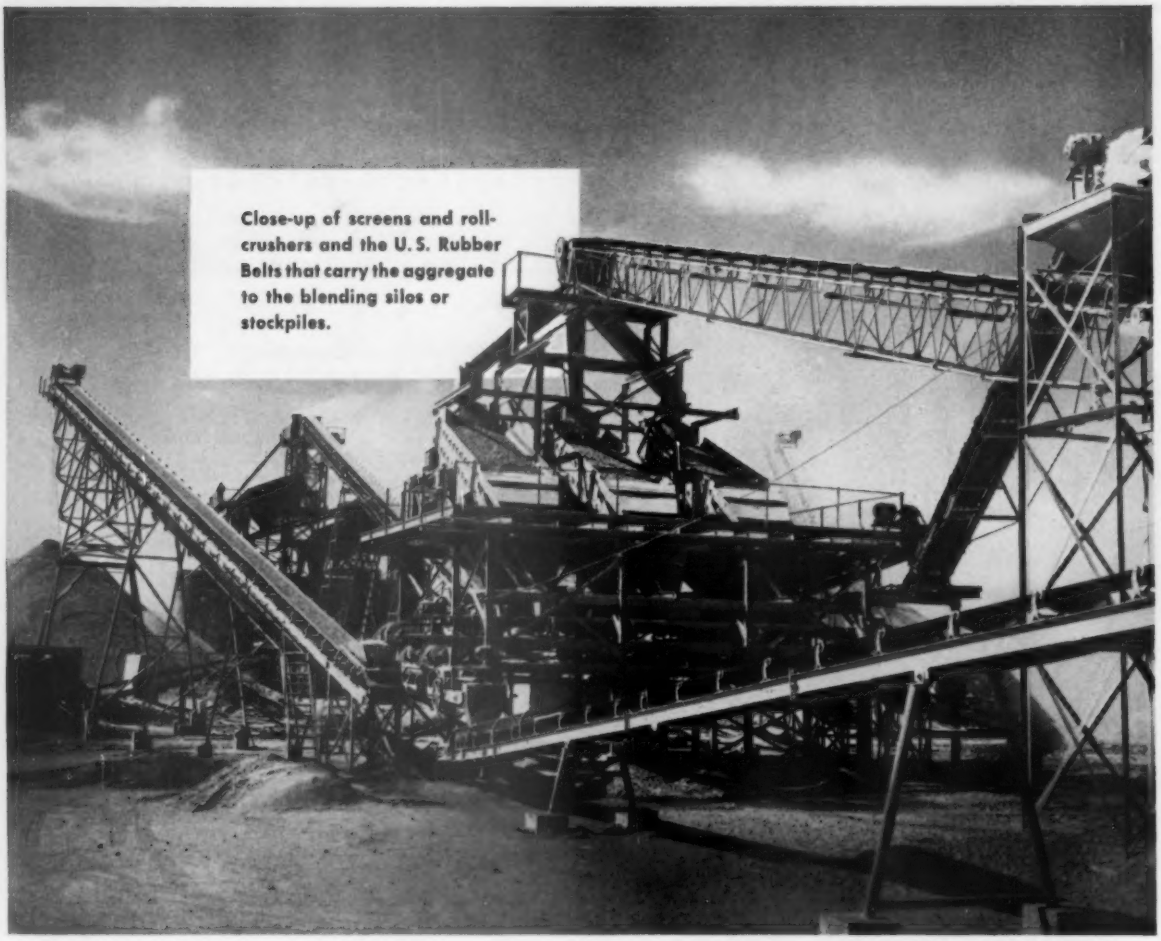
SERVICE TIP: Never allow your present machine components to become worn to the point where reconditioning is impossible.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

US RUBBER CONVEYOR BELTS


Close-up of screens and roll-crushers and the U. S. Rubber Belts that carry the aggregate to the blending silos or stockpiles.

Standard Industries, Inc. gets more tons per dollar with "U.S." Conveyor Belts

The first U. S. Rubber belt to prove this was installed in 1957. It was Matchless® 30" x 4-ply TN cotton-nylon fabric, ¼" top cover, including special impact breaker with 1/32" bottom cover. It was used on a drive that rapidly wore out ordinary belts. Each "U. S." Belt has lasted an average of 4 times longer in continuous operation, proving that more tons per dollar come from the use of "U. S." Belts.

With this graphic proof of performance, the new plant of Standard Industries (Tulsa, Okla.) was completely equipped with "U. S." Conveyor Belts in its crushing and loading facilities.

"U. S." Conveyor Belt engineers stand ready to duplicate their "more tons per dollar" service in your plant. Whether you simply require a replacement or would like a complete study of your facilities, you can reach the U. S. Rubber man through your local U. S. Rubber distributor.

US RUBBER Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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News of the Industry

Allentown Cement Co. Joins National Gypsum In Major Expansion Move

National Gypsum Company directors have authorized the acquisition of the Allentown Portland Cement Company of Allentown, Pa., through an exchange of National Gypsum stock. This stock, now valued at about $31,000,000, would be exchanged for all outstanding shares of Allentown stock.

The formal offer to Allentown shareholders is expected to be made in August, after clearance with the Securities Exchange Commission.

This will be the second-largest corporation acquisition in National's history, topped only by the deal in which Huron Portland Cement Company joined the firm a year ago. The acquisition of the cement firm will give National distribution in about one-third of the nation. Allentown Portland Cement, with plants in Evansville, Ind., and West Conshohocken, Pa., has an annual capacity of 4,500,000 bbl. In 1959 the firm's earnings were $3,230,918 on net sales of $13,507,047.

Lane Mountain Silica Co. Plant Being Erected in Washington

Construction is under way on a $500,000 high-grade silica sand plant near Valley, Wash. Plans for the facility were announced late last year by officials of Lane Mountain Silica Company, who expect the 300 t.p.d. plant to be in operation late this year.

Northwestern Glass Company, Seattle, Wash., and Del Monte Properties Company, Pebble Beach, Calif., own about 70 percent of the stock of Lane Mountain Silica, a Washington corporation. Officers of the latter firm are: Richard Osborne, president; Hugh H. Bein, vice-president; Stanley P. Jones, secretary; and Murray Mathews, treasurer.

Sand ore will be crushed at the 1,000-acre deposit site on Lane Mountain, and then trucked to the plant for processing. The mill will be under the management of the Del Monte Properties Company, with Charles Smith as superintendent, and Hugh Bein in charge of construction. William Hanot of Northwestern Glass is chief engineer.

The Canadian Gypsum Company, Ltd., a U.S. Gypsum Company subsidiary, has opened a multimillion-dollar addition to its plant at Hagersville, Ont. Built directly over the gypsum mine 100 ft. below ground, the new plant is adjacent to the firm's existing facilities. This expansion more than doubles previous capacity.

Ohio Lime Company To Acquire Control Of United Cement Co.

Acquisition of controlling interest in United Cement Company, Incorporated, Montevallo, Ala., by Ohio Lime Company, Woodville, Ohio, has been approved by the directors of both firms. The deal must be ratified by the stockholders.

United Cement was formed in 1955 to produce high-calcium lime and limestone products. It operates a rotary kiln lime plant and a high-calcium limestone quarry.

Ohio Lime produces finishing and dolomitic lime, dead-burned refractory dolomite, and crushed stone.

Coming Events

September 29-30, October 1, 1960—Chicago. Fall Operators' Meeting, National Lime Association. Conrad Hilton Hotel.

October 3-5, 1960—Pebble Beach, Calif. Semi-annual meeting, National Sand and Gravel Association board of directors. Del Monte Lodge.

October 10-13, 1960 — Las Vegas, Nev. Metal Mining and Industrial Minerals Convention Exposition, American Mining Congress.

October 17-21, 1960—Chicago. 48th Annual National Safety Congress, National Safety Council.

November 3-4, 1960—Washington, D. C. Annual meeting, National Slag Association, Hotel Mayflower.

January 17-19, 1961—Washington, D.C. Sixteenth annual convention, National Limestone Institute, Inc. Statler-Hilton Hotel.

January 17-20, 1961—Bal Harbour, Miami Beach. Annual convention, National Crushed Stone Association. The Americana.

January 23-26, 1961—Bal Harbour, Miami Beach. Joint convention, National Sand and Gravel Association and National Ready Mixed Concrete Association. The Americana.

May Construction Awards Drop From April Level—Also Down From 1959

May future construction contracts in the United States (excluding Alaska and Hawaii) totaled $3,336,723,000 — down 6 percent from the same month last year. This is the tenth consecutive month showing a drop in award totals, compared to the same months in 1959. It is also a drop from the level established in April, 1960.

On a seasonally adjusted basis, the Dodge Index of construction contracts fell from 266 in April to 244 in May (1947-49=100).

The May decline was accounted for primarily by the housing sector of construction, according to F. W. Dodge Corporation. Housing contracts have been running well below 1959 levels, and the May figures give no indication of the pick-up which should result from easier money, George Cline Smith, F. W. Dodge chief economist, commented.

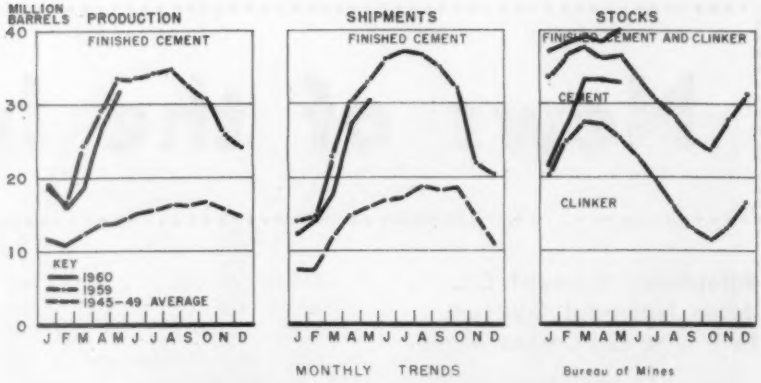
There were some very bright spots in the May contract scene, however: educational buildings were up 29 percent over a year ago; factories were up 20 percent; and electric light and power systems were up 269 percent.

ITEM: housing contracts amounted to $1,452,872,000 — down 13 percent from March, 1959.

ITEM: heavy engineering contracts amounted to $774,175,000—down 2 percent. Highway contracts were down 21 percent.

ITEM: non-residential building contracts totaled $1,109,676,000—up 4 percent.

CUMULATIVE TOTALS for the first five months of 1960 and the percentage changes from the corresponding period of last year: total construction, down 7 percent to $14,122,786,000; housing, down 14 percent to $6,120,524,000; non-residential building, up 1 percent to $4,700,173,000; and heavy engineering, down 4 percent to $3,302,089,000.



—May, 1960, Finished Portland Cement—

SUMMARY—Production of finished portland cement in May, 1960, as reported to the U. S. Bureau of Mines, totaled 31,832,000—a decrease of 5 percent, compared with May, 1959. Mill shipments totaled 30,185,000 barrels—a decrease of 9 percent, compared with May, 1959. Stocks of 40,085,000 barrels of finished portland cement on hand May 31, 1960, were 10 percent higher than those on hand May 31, 1959. Clinker production totaled 30,885,000 barrels—a decrease of 3 percent, compared with May, 1959.

PRODUCTION—One hundred and seventy-two plants in 37 states and Puerto Rico reported a production of 31,832,000 barrels of finished portland cement during May, 1960, compared with 33,428,000 barrels produced in May, 1959. The Dundee Cement Company of Dundee, Mich., is included among the producing plants for the first time.

Production of clinker was 30,885,000 barrels, compared with 31,956,000 barrels during May, 1959.

High-early-strength portland cement totaled 1,262,000 barrels—a decrease of 7 percent, compared with May, 1959, production.

Prepared masonry cement production of 1,428,000 barrels decreased 7 percent from the May, 1959, figure.

SHIPMENTS—Mill shipments of finished portland cement for May, 1960, were reported by one hundred seventy-two plants and totaled 30,185,000 barrels—compared with 32,992,000 in May, 1959.

Shipments were higher in 5 districts and lower in 18 districts.

Mill shipments of high-early-strength portland cement totaled 1,265,000 barrels—a decrease of 13 percent from the 1,460,000 barrels shipped in May, 1959.

Mill shipments of prepared masonry cement totaled 1,454,000 barrels—a decrease of 10 percent from the 1,615,000 barrels shipped in May, 1959. Prepared masonry cements are shown in 376-lb. barrels, although sold in barrels of varying weights.

STOCK—Mill stocks of 40,085,000 barrels of finished portland cement were on hand May 31, 1960—an increase of 10 percent over the 36,527,000 barrels on hand May 31, 1959. Stocks of clinker on hand May 31, 1960, totaled 33,049,000 barrels—an increase of 27 percent over the 26,037,000 barrels on hand May 31, 1959.

FIRST FIVE MONTHS OF 1960—For the January-May period, the volume of production of finished cement amounted to 112,018,000 barrels, compared with 122,172,000 barrels in January-May, 1959. Total shipments for the first five months of 1960 are reported at 102,549,000 barrels; in the same period of 1959 total shipments were 115,355,000. (Shipment figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: May, 1959—286,000 barrels; January-May, 1959—1,099,000 barrels; May, 1960—283,000 barrels; January-May, 1960—976,000 barrels.) ●

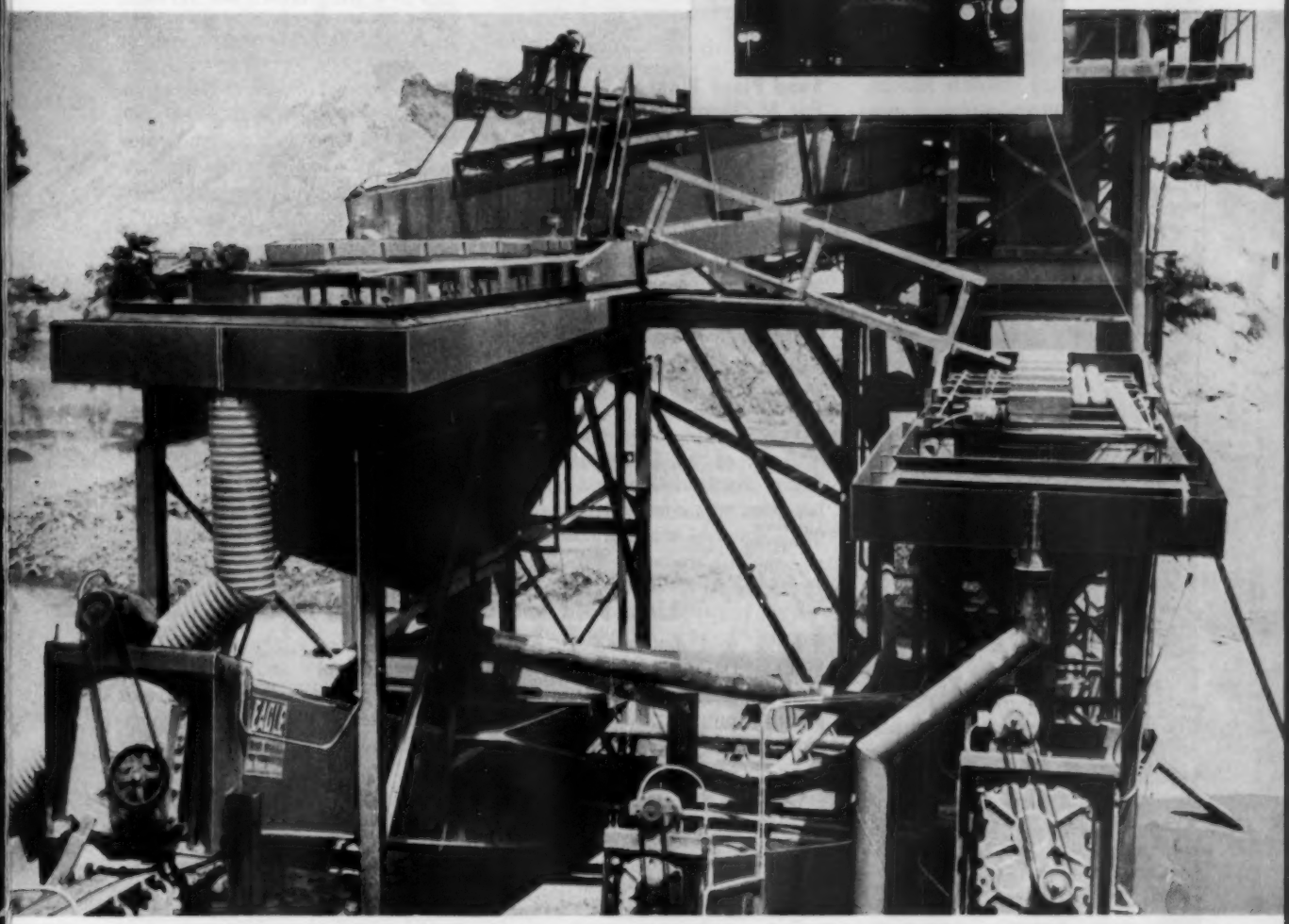
Refiners of petroleum asphalts will spend more than $4,000,000 on product research in 1960, says J. E. Buchanan, president of the Asphalt Institute. In his report to the board of directors of the institute, Mr. Buchanan states that according to a survey of member-companies, sums totalling this amount have been earmarked for research, and that their combined programs will employ 216 full-time researchers, engineers, and technicians.

Permanente Cement Company's Honolulu plant is expected to be in operation in August. The new plant will have a capacity of 1,700,000 bbl. annually. Completion of the new facility will have a direct influence on the California market since cement need no longer be shipped in from the Mainland.

Spokesmen for the Southwest Potash Corporation, a division of American Metal Climax, Inc., have announced that a $7,000,000 plant is to be built at Vicksburg, Tenn., for the production of chemical fertilizer. It was indicated that the proposed facility is the result of research and a pilot plant developed by scientists and engineers at the Colorado School of Mines Research Foundation in Golden, Colo.

Enter 25 on card, page 145 →

Eagle Equipment helps on U.S. Capitol "face lifting" job!



"We Are Readily Meeting Federal Specs"

Says C. E. Reithmeyer, Jr., Supt., Forestville Sand & Gravel Co., Inc., Upper Marlboro. Md.

Forestville Sand & Gravel Co., Inc., readily meets aggregate specifications with their Eagle Sand Washing-Classifying-Dehydrating Section and their Eagle Log Washer. The sand section is producing a high quality concrete sand and the log is processing gravel from ⅜" to 1½".

Most of the material produced is going into concrete for three vital projects in Washington, D.C.—the expansion work and new front on the Capitol, the new House of Representatives Office Building and the new 12th Street Expressway.

C. E. Reithmeyer, Jr., Supt. of Forestville Sand & Gravel Co., shown at right, reports that they have no trouble meeting federal specifications as well as State of Maryland specifications. He states that the Eagle equipment is smooth running and also requires a minimum of attention.

Several years ago Forestville installed an Eagle single screw Washer-Classifier-Dehydrator and 16' Water Scalping-Classifying Tank, which was later extended to 24' to meet increasing capacity demands. A 24' length log washer was added when plastic clays were found in the deposit. Based on successful, economical performance they recently added a 32' Water Scalping-Classifying Tank and two more single screw units.

Eagle Equipment has served many producers well and long—as a result Eagle has a large storehouse of valuable experience upon which producers everywhere can draw. If your profit picture isn't what it should be it will pay you to look to Eagle. Send for Catalog.

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Diamond Portland Cement To Become a Division Of Flintkote Company

Directors of The Flintkote Company and of The Diamond Portland Cement Company (Middle Branch, Ohio) have approved a plan of merger through an exchange of stock. The proposed merger (which would make Diamond a Flintkote Division) is subject to the approval of the stockholders of both companies.

Diamond Portland, established in 1892, completed an expansion program in 1958 that boosted rated annual capacity of its two operating plants at Middle Branch to 3,000,000 bbl. Sales volume in 1959 reached $7,619,000, and earnings $1,064,662 (equal to $3.55 per common share).

R. D. Raff, president of Diamond, is scheduled to remain in that capacity should the merger be approved.

Flintkote entered the cement field in August, 1957, when it acquired Kosmos Portland Cement Company, Louisville, Ky. In 1959, Glens Falls Portland Cement Company and Calaveras Portland Cement Company were acquired. All mergers were followed by expansions or modernizations.

Internatl. Min. & Chem. Mine In Canada Nears Completion

The management of International Minerals & Chemical Corporation, Skokie, Ill., expects to produce about 420,000 tons of potash annually from its mine near Esterhazy, Sask. The surface refinery is nearly completed, and work is still continuing on the 3,100-ft. shaft.

Water-bearing Blairmore sands and accompanying problems are being curtailed through freezing a 300-ft. section between the 1,200-ft. and 1,500-ft. levels to facilitate shaft sinking.

W. E. Dickinson Elected Head Of Calcium Chloride Institute

William E. Dickinson, executive vice-president and chief engineer of the Calcium Chloride Institute, was elected president of that organization, effective August 1.

As the chief executive officer of the institute, Mr. Dickinson replaces George H. Kimber, who has been president since 1946. Mr. Kimber will remain in the capacity of chairman of the board.

Sand Plant Planned in Florida For Michigan Concern

The Florida Division of the Oakland Consolidated Corporation of Michigan has awarded a $220,000 contract to Meckum Engineering, Inc., Ottawa, Ill., for the erection of a sand plant two miles west of Clermont, Fla.

Site of the plant is a 100-acre tract purchased last spring. The firm has options on 500 additional acres.

DON RIGHTENBURG, former sales manager of the Detroit district of Huron Portland Cement Company, has been appointed manager of the newly created Detroit division.

33,000,000 Bbl. Capacity At Inland Cement Co., Ltd. As 3rd Kiln Goes on Stream

A $4,500,000 extension of the plant of Inland Cement Company, Ltd., has been opened at Edmonton, Alta. The installation of a new 340-ft. rotary kiln, with accompanying mills, silos, and auxiliary facilities, has tripled original production. The production potential is now 3,300,000 bbl. annually.

In addition to the 11-ft. diameter kiln, the new equipment includes two cement mills, one slurry mill, one wash mill, two blending silos, and six 1,700-ton storage silos.

Inland began shipping cement from the first kiln at Edmonton in April, 1956; but company directors decided to double the size of the installation. A second kiln sent output to 1,800,000 bbl. per year.

Lime Sold and Used in April, 1960

Lime sold and used in April, 1960—1,046,562 short tons—decreased, compared to the previous month's output, according to reports issued by producers to the United States Bureau of Mines.

Agricultural and construction lime increased, whereas decreases were noted in refractory and chemical and other industrial lime.

Lime Sold and Used by Producers* in the United States, in Specified Periods of 1959-60, by Types and Major Uses in Short Tons

	March	April		January - April	
	1960	1960	1959	1960	1959
By types:					
Quicklime	847,061	799,203	672,181	3,211,186	2,491,631
Hydrated lime	220,654	247,359	187,933	858,648	632,109
Total lime	1,067,715	1,046,562	860,114	4,069,834	3,123,740
By uses:					
Agricultural:					
Quicklime	2,297	11,272	9,993	17,980	24,405
Hydrated lime	8,785	17,341	19,737	35,742	46,889
Total	11,082	28,613	29,730	53,722	71,294
Construction:					
Quicklime	6,892	7,027	14,766	26,712	49,106
Hydrated lime	66,240	85,794	88,696	274,143	280,304
Total	73,132	92,821	103,462	300,855	329,410
Chemical and other industrial:					
Quicklime	609,578	595,845	427,581	2,301,017	1,587,221
Hydrated lime	145,629	144,224	79,500	548,763	304,916
Total	755,207	740,069	507,081	2,849,780	1,892,137
Refractory (dead-burned dolomite)	228,294	185,059	219,841	865,477	830,899

*The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

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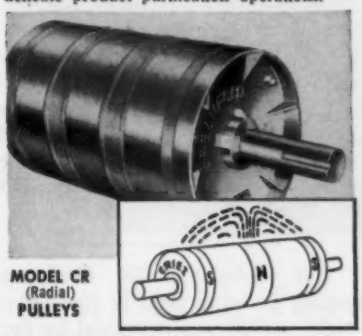
permanent non-electric Erium-powered*

MAGNETIC PULLEYS

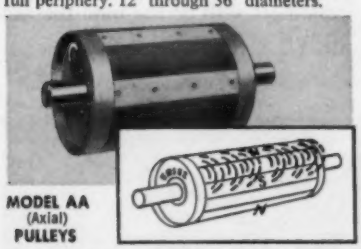
Now in 2 "duty-rated" designs—to give you the finest automatic separation for your exact application—fine iron or tramp iron removal.

NEW, EXPANDED LINE! New design, new magnetic efficiency permit increased operating range and effectiveness with 2 different magnetic actions. Peak protection for all operations—from rugged crusher protection through delicate product purification operations.



MODEL CR (Radial) PULLEYS

For removing large pieces of tramp iron from heavy depths of flow. Provides a strong, deep magnetic field of equal intensity around the full periphery. 12" through 36" diameters.



MODEL AA (Axial) PULLEYS

Excellent for nne iron separation, as well as small and medium pieces of tramp iron, in average material flows! Strong magnetic field of equal force extends across the full width of the pulley. 8", 12", 15", & 18" diameters.

Prevent product contamination, machinery damage, fires, explosions, downtime. 2 designs, 4 magnetic strengths, 8 diameters, 14 belt widths. No operating or maintenance costs. For all materials, wet or dry, on belts of non magnetic material. Fast, simple installation.

**Erium —an exclusive, high quality permanent magnetic power source specifically designed and energized by Eriez.*

New fact-filled 6-page bulletin has installation photos, selector guide, etc. Write today! Eriez Mfg. Co. 113-HA Magnet Drive, Erie, Pa.

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Flintkote Gets Reserves Of Newfoundland Gypsum Under Canadian Contract

Spokesmen for the Flintkote Company have announced that the firm is to have access to 40 square miles of gypsum deposits at Flat Bay, Newfoundland, under the terms of an agreement with this province. Eventually Flintkote will have access to nearly 3,000 squares miles. According to I. J. Harvey Jr., Flintkote chairman, the gypsum reserves contain more than 200,000,000 tons.

Operation of the Atlantic Gypsum Company at Corner Brook will be taken over by Flintkote, and the latter will acquire certain assets of this firm for $1,000,000 cash.

Newfoundland will be paid 5 cents per long ton for gypsum rock, which will be mined by Flintkote and shipped via new facilities for export.

Four new producing plants are to be built for the company—one at Fort Dodge, Iowa, two in the Great Lakes area, and a fourth in the Savannah-Brunswick area of Georgia. Flintkote has an option on gypsum properties at the Iowa site.

Permanente Denies Charges Of Anti-Trust Violation

Officials of the Permanente Cement Company, Oakland, Calif., have issued both a denial of Federal Trade Commission charges that the firm violated the anti-merger section of the Clayton Anti-trust act, and an intention of defense by counsel of the firm's actions. The F.T.C. has charged that the firm and a wholly-owned subsidiary, Glacier Sand & Gravel Company, Seattle, Wash., violated the law in the acquisition of three concerns.

Permanente officials stated that the 1958 acquisition of Olympic Portland Cement Company, Seattle, and the 1959 acquisitions of Pacific Building Materials Company and the Readymix Concrete Company, both of Portland, Oreg., did not substantially lessen competition nor tend to create a monoply, as alleged by the commission.

JOHN H. ALEXANDER, Abilene, Tex., has joined the Portland Cement Association staff as general field manager of the Wichita Falls, Tex., branch office.

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Here's the newest and most efficient answer to those hard-to-move materials in sticky bins . . . designed to provide superior operating efficiency . . . exclusive pinpointed vibration gets right to the trouble spot — starts stubborn materials moving!

NO RECTIFIER NEEDED • COMPLETELY ENCLOSED HOUSING • GREATER VIBRATION IMPACT THAN COMPARABLE SIZE UNITS • RUGGED AND DURABLE • LOW FIRST COST • LOW OPERATING AND MAINTENANCE COST

Special Mill Mutual ACCEPTED Units for HAZARDOUS DUSTY LOCATIONS

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Eriez Mfg. Co., 113-HB Magnet Dr., Erie, Pa.

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• Man, dig that crazy parking lot! That's how a bopster might describe this scene in an abandoned quarry in northeast Springfield, Mo. Actually, it's an inconspicuous (from the ground, at least) graveyard for car bodies waiting to be crushed for scrap. The site is a quarry abandoned in 1953 by the Garrett Construction Company, which got an average of 100,000 tons of limestone out of the pit each year during its 28 years of operation. The stone was used first for highway construction and later for ready-mix cement.

Now a Springfield salvage firm is using the old quarry. Between 1,300 and 1,400 cars, stripped of salvageable parts, are waiting for the junkman.

Biggest Bucket Wheel Digger To Be Handled by U. S. Firm

Sales rights in the United States and Canada for the LMG bucket wheel excavator have been acquired by the Link-Belt Company. The excavating wheel is manufactured in West Germany by the heavy machinery firm of Orenstein-Koppel and Lubecker Maschinenbau AG—known as LMG. The self-propelled, crawler-type excavator is built in sizes that have capacities ranging from 200 to 13,000 cu. yd. per hour.

The rotating digging wheel, which has buckets on its periphery, is used in open-pit mining for large-volume removal of earth, overburden, gravel, sand, certain ores, and lignite. The wheel is located at the end of the boom, which can be raised or lowered; on some models the boom can also be thrust forward and retracted.

Digging is continuous, and the excavated material is delivered from the discharge boom belts in a relatively uniform flow. For this reason, it is reported, the belt conveyor system behind the excavator can be narrower and less expensive than would be required for the same average capacity from intermittent-type excavators with their high peak loads. Hence, the inherent economies of belt transportation are improved with the use of bucket wheel excavators.

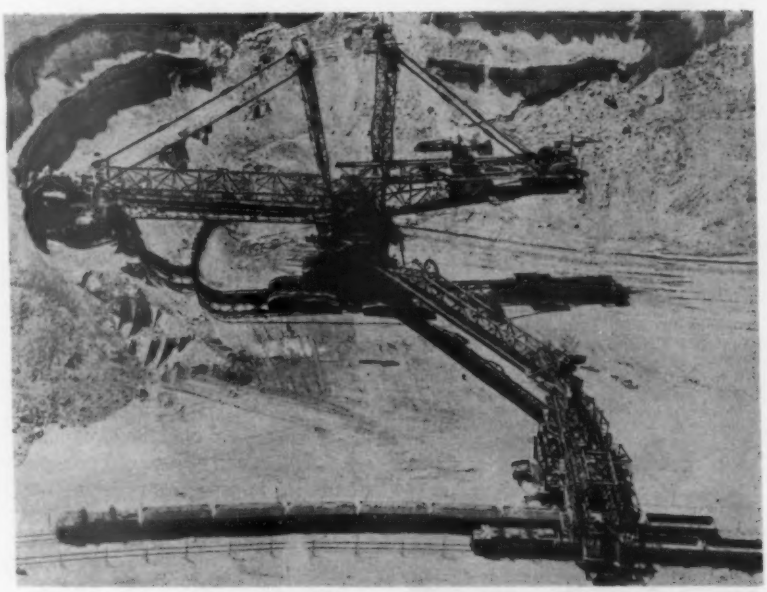
Bucket wheel diameters range from 8 ft. to 52 ft. The largest units built to date have a maximum cutting depth of 66 ft. and a maximum cutting height of 164 ft. from a single bench. The outreach of the bucket wheels is 302 ft., and the outreach of the loading belt conveyors is 121 ft.

New Perlite Institute Bulletin Covers Curtain Wall Backup

The Perlite Institute, Inc., New York City, has published its fifth edition of *Perlite Design News*, which covers perlite concrete backup for curtain walls. The pamphlet differentiates between the perlite sandwich-panel types of curtain wall, and the skin, or perlite, backup type.

The bulletin, A.I.A. File No. 4-E-13, includes diagrams of typical spandrel sections and serves as a reference to architects, designers, and contractors. Copies are available from the Perlite Institute, Inc., 45 W. 45th St., New York 36, N.Y.

The Johns-Manville Company perlite crushing plant at No Agua, N.M., which was destroyed by fire in April, will be rebuilt. The company is devising means to supply customers with perlite until the new plant is in operation.



Working in the Fortuna Mine, West Germany, the world's largest bucket wheel excavator shown here has a capacity of 13,000 cu. yd. per hour. The excavator has 12 digging buckets mounted on a 52½-ft. wheel. Booms of the wheel and discharge conveyor rotate independently permitting excavated material to be discharged in one place while the boom is rotating through its digging range. Excavators of this type will soon be available in the United States and Canada.

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Two Russian engineers study operation of one of the new British drills during a demonstration in a Derbyshire, England, quarry. The 4 drifter units were built to Soviet operating specifications.

New British Tower Drills Built for Soviet Trade

Fifteen crawler-mounted tower drill rigs of unique design are to be shipped from Britain to Russia in the near future. They are being supplied under a contract in excess of £250,000 won by Climax Rock Drill and Engineering Ltd., a Holman Group subsidiary, in conjunction with F. Taylor & Sons (Manchester) Ltd.

The first of these machines was recently demonstrated to engineers of a U.S.S.R. trade delegation at a Derbyshire, England, quarry. To meet Russian requirements, it was shown that four holes could be drilled simultaneously, to a depth of 13 ft., and ranging from horizontal up to a 30-degree angle. Drilling speed, using 2¼-in. Holman tungsten carbide-tipped Holbits, was 16 in. per minute.

An outstanding feature of this new type of mobile machine is that four drifters, comprised of medium-weight drills mounted on power feed cradles, can be operated simultaneously by two men, over long periods, with the minimum of operator fatigue.

The unit can drill a rock face from ground level up to 32 ft. in height, and over a horizontal span of 24 ft. The rig is described as very stable under drilling conditions, even when the platform is at its highest position, when the hydraulic booms are fully raised, the drifters are spread out to the full 24-ft. operating width, and the crawlers are standing on a gradient of 1 in 10.

In operation, the hydraulically operated booms and collapsible tower are remote-controlled from panels on the platform at the top of the tower. The tower itself is mounted on an electrically driven crawler frame capable of negotiating rough terrain. A gradient of 1 in 7 was successfully tackled during the recent tests.

To permit the feed cradles to be pushed up to the rock face, crowding rams of 30-in. stroke are provided. The tower can also be collapsed to a height of 11 ft. to facilitate movement in confined spaces underground.

The crawlers and hydraulic pump are driven by 40- and 7½-hp. electric motors, respectively, and a compressed air supply rated at about 700 c.f.m. is required for the drifters.

MAURICE FERRE, president of Ponce Products, Inc. (a part of Ferre Industries), Miami and Port Everglades, Fla., has been elected a member of the Young Presidents' Organization, a national group of men and women who became presidents of their companies before reaching the age of 40. Mr. Ferre, 25, was elected president of Ponce last February.

●In this picture the ROCKLAND COUNTY, first modern push-type towboat operating on the Hudson River, is pushing a 21,000-ton tow of barges loaded with crushed stone during successful performance trials. Designed and built by Dravo Corporation, Pittsburgh, the 1,800-hp. vessel will be operated by the Cornell Steamboat Company, a subsidiary of the New York Trap Corporation.

The ROCKLAND COUNTY is 105 ft. long and 30 ft. in the beam, and has a depth of 11 ft. 7 in. Twin propellers are mounted within Kort nozzles, and there are six rudders—two in front and one aft of each propeller. The special nozzles increase push power approximately 25 percent.

Construction Put in Place Rises 7 Percent in June—But 6-Mo. Total Falls

The value of new construction put in place in June amounted to $4.9 billion, according to preliminary estimates of the U.S. Department of Commerce. This figure is 7 percent above the May, 1960, level and 5 percent less than in June, 1959.

ITEMS: Private construction, estimated at $3.4 billion, was up 7 percent from May, but down 4 percent from June, 1959. Residential increased 9 percent from May — slightly more than the usual seasonal rise, causing the seasonally adjusted annual rate to rise slightly—but the amount was down 9 percent from June, 1959.

ITEMS: Public construction, estimated at $1.5 billion, was up 9 percent from May, but down 9 percent from June, 1959. The increase was less than normal for the period, and increased expenditures for nonresidential buildings and for military facilities were less than normal.

CUMULATIVE TOTALS for the first six months of 1960: Total value of all construction expenditures—$24.5 billion, 3 percent below the comparable 1959 total; seasonally adjusted annual rate of total new construction expenditures — $53.4 billion, about one percent under the estimated May, 1960, rate, with lower public construction expenditures as the main cause. Private construction expenditures — $17.6 billion, about the same as the total for the first half of 1959. Private residential— $9.6 billion, 7 percent less. All remaining categories of private construction (except farm construction)—cumulative expenditures are ahead, most of them substantially higher than comparable 1959 totals. Public construction expenditures—$6.9 billion, 10 percent less.

M. J. Grove Lime Company To Join Flintkote in Merger

The Flintkote Company will acquire the assets of M. J. Grove Lime Company, Lime Kiln, Md., for 100,800 shares of as-yet-unissued $2.25 convertible second preferred stock in a merger plan approved by the directors of both companies. The plan is subject to the final approval of Grove Lime stockholders, and the approval of Flintkote stockholders for issuance of the new preferred stock. The cost to Flintkote is estimated at about $5 million.

W. Jarboe Grove, president of the lime firm, will remain in charge of its operations when it becomes a Flintkote division.

Grove Lime, a closely-held company that was founded in 1858, supplies lime products, crushed stone, concrete block, concrete pipe and ready mixed concrete in northern Virginia and southern Maryland. The company also is engaged in street and road construction. Its sales exceed $6 million annually.

ALBERT LOUIS BITTER, 75, retired official of the Menke Stone & Lime Company, Quincy, Ill., died recently. Until he retired five years ago, Mr. Bitter was executive vice-president of Menke and had been associated with the firm since 1902.

Cement Silo Permits Weighing At 3 Weighbridges at Once

A reinforced concrete silo of contemporary design was recently erected at the Roodepoort plant of Anglo-Alpha Cement Ltd., Johannesburg, South Africa, to permit the loading and weighing of cement on three weighbridges simultaneously and over each weighbridge from two movable loading points (for truck with trailer).

Above ground level, the new facility is 65 ft. 6 in. high and 38 ft. square. Below ground level, its foundations, including the weighbridges, go down 8 ft. 6 in. It consists of an upper cubical structure, and a lower structure with trapezoidal and inclined walls, the whole being supported on reinforced concrete stilts.

The cubical structure contains, in its lower half, four steel hoppers, each weighing about 24 tons and each having a capacity of approximately 100 tons, for storing various types of cement. In the upper half of this section, space is reserved for screening and de-dusting the cement and for distributing it to the hoppers.

In the lower portion of the structure is the operating room. This section of the building had to be constructed without internal obstructions.

The small building in front of the new bulk-loading building (see photo) is the dispatching office.

A general view of the new 400-ton capacity cement silo of Anglo-Alpha Cement Ltd. at Roodepoort, South Africa. At the left is the dispatching office.

SHORTENS TRUCK HAUL 50% with LINK-BELT belt conveyor

BELT CONVEYOR at Inkom plant of Idaho Portland Cement Company passes under road on way to mill storage bins.

Idaho Portland Cement Co. also trims costs with heavy-duty CA vibrating screen

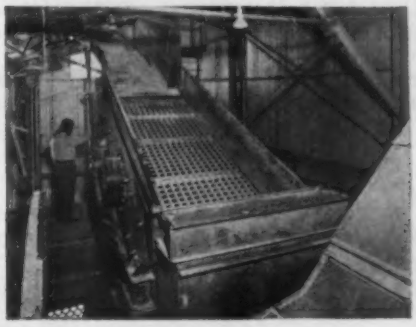
Until lately, trucks shuttled the entire distance between quarry and crushing and screening plant at Portland Cement Co.'s Inkom (Idaho) mill. Now half the trip—825 ft.—is spanned by a Link-Belt overland belt conveyor connecting a new crushing and screening plant with storage facilities at the mill. Carrying minus ¾-in. limestone at 150 tph, it enables trucks to make more quarry-to-crusher trips per shift . . . has paid off in healthy savings.

At the screening station, Link-Belt CA vibrating screens feed a now-smaller-sized limestone to ball mills, increasing their capacity and reducing maintenance. Sizing conforms to the exact needs of the main plant, with no further crushing or screening needed.

There may well be opportunity for comparable savings at your plant. Investigate—call your nearest Link-Belt office. 10,210

LIMESTONE SOURCE is hill which forms background for 825-ft. belt conveyor and crushing and screening building.

VIBRATING SCREEN, heavy-duty, double-deck type, sizes crushed limestone to minus ¾ inch. Oversize is chuted to hammermill.



LINK-BELT

CONVEYING AND PREPARATION MACHINERY

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

Enter 1 on card, page 145

PIT AND QUARRY, August, 1960. Vol. 53, No. 2. Published monthly by Pit and Quarry Publications, Inc., 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U.S., possessions and Canada. Central and South America $10 for 1 year, elsewhere $15. Single Copy $.50 except $1 for January, May and July. Entered as second class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. *Postmaster: Please send notices on Form 3578 and copies returned under label Form 3579 to 431 South Dearborn Street, Chicago 5, Ill.*

GET NEW MOBILITY FOR DRILLS UP TO 6 INCH BORE

with the JOY TDH Trac-Drill

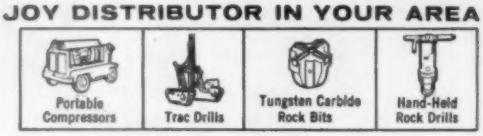
The new Joy TDH Trac-Drill is a sure-footed carrier for Joy's powerful 5¼", 5½" and 6" bore percussion drills. Rugged enough to support these large drills with ease, it is also amazingly flexible and mobile. The TDH moves quickly, (at speeds up to 60 fpm), over the roughest ground because its crawler tracks are free to oscillate —to move and swivel independently of each other.

Wide track gauge, 85⅞" center line to center line, and long tracks (88" of ground contact with each track) gives the TDH positive traction and stability. Mounted low on the frame for stable support, the mast handles 20 foot steel changes, and can be hydraulically positioned to drill at angles from 15° in front of vertical to 10° above horizontal.

A big drill for big jobs, the TDH requires just one man for all operations. All machine functions are power-controlled from the operator's station. Have your Joy representative arrange for you to see this flexible, big-hole drill, or write for Bulletin 1419-26.

JOY CONSTRUCTION EQUIPMENT IS SOLD AND SERVICED BY THE JOY DISTRIBUTOR IN YOUR AREA

JOY



Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

KOEHRING HEAVY DUTY

KOEHRING *MEANS* HEAVY DUTY

The words "HEAVY DUTY" are an important part of the Koehring trademark . . . have been for years. And there's a mighty good reason: Koehring excavators have proved through millions of hours of service that you can count on them to outproduce and outlast other makes even under the most severe digging conditions. They're *heavy duty* through and through.

Take the front end, for instance. The big tough rock boom, double dipper sticks, rugged chain crowd, and long wearing dipper give you real *heavy duty* dependability at the business end. Or take the crawlers. Each individual shoe actually is strong enough to support the *entire machine,* plus its rated load. Or take the main machinery. Shafts are kept in perfect alignment because side stands are line bored in place as a unit.

Yes, Koehring *means* Heavy Duty. That's why you can *expect* more from a Koehring excavator . . . why you *get* more from a Koehring.

K10

See your distributor about the Koehring Equipment Show Waukesha, Wisconsin Week of September 19

MORE WORK CAPACITY...

MORE PROFIT PER DOLLAR INVESTED

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

23 Winners Listed by N.L.A. In 1959 Safety Competition

CERTIFICATES of Achievement in Safety were awarded 23 of the 57 participants in the 1959 silver anniversary of the National Lime Association Safety Competition, conducted annually by the U. S. Bureau of Mines. This is the largest number of awards since the competition began in 1935. The Certificates are awarded in recognition of outstanding safety attainments in operating through the 1959 competitive year without a disabling work injury.

Winners in Group A1—Quarries with calcining plants working 100,000 or more man-hours—are:

Genoa plant, Genoa, Ohio, U. S. Gypsum Co., 445,387 man-hours

Woodville plant, Woodville, Ohio, Standard Lime and Cement Company, Division of American-Marietta Co., 349,434 man-hours

Plymouth Meeting plant, Plymouth Meeting, Pa., G. and W. H. Corson, Inc., 346,569 man-hours

New Braunfels plant, New Braunfels, Tex., U. S. Gypsum, 256,361 man-hours

Galloway plant, Galloway, Mo., Ash Grove Lime and Portland Cement Co., 245,003 man-hours

Natividad plant, Moss Landing, Calif., Kaiser Aluminum and Chemical Corporation, 237,866 man-hours

Knoxville plant, Knoxville, Tenn., Standard Lime and Cement Co., Division of American-Marietta Co., 117,785 man-hours

York plant, York, Pa., National Gypsum Co., 104,244 man-hours

Winners in Group A2—Quarries with calcining plants working less than 100,000 man-hours—are:

Diamond Springs Plant, Diamond Springs, Calif., Diamond Springs Lime Co., 96,066 man-hours

Utah plant, Grantsville, Utah, Material Service Corp. (Marblehead Lime Co.), 78,793 man-hours

Millville plant, Harpers Ferry, W. Va., Jones and Laughlin Steel Corp., Blair Limestone Division, 66,051 man-hours

Manitowoc plant, Manitowoc, Wis., Rockwell Lime Company, 14,411 man-hours

In Group B—Underground mines with calcining plants—the following operations were the winners:

Bellefonte plant, Bellefonte, Pa., National Gypsum Co., 359,428 man-hours

Pleasant Gap plant, Pleasant Gap, Pa., Standard Lime and Cement Co., Division of American Marietta Co., 223,646 man-hours

Kimballton plant, Kimballton, Va., Standard Lime and Cement Co., Division of American-Marietta Co., 190,088 man-hours

Hannibal plant, Hannibal, Mo., Material Service Corp., (Marblehead Lime Co.), 125,252 man-hours

Quincy plant, Quincy, Ill., Material Service Corp. (Marblehead Lime Co.), 55,652 man-hours

In Group C—Calcining plants only—these plants were the winners:

Thornton plant, Thornton, Ill., Material Service Corp. (Marblehead Lime Co.), 160,798 man-hours

South Chicago plant, Chicago, Ill., Material Service Corp. (Marblehead Lime Co.), 117,124 man-hours

Ludington plant, Ludington, Mich., The Dow Chemical Co., Ludington Division, 86,467 man-hours

Springfield plant, Springfield, Mo., Ash Grove Lime and Portland Cement Co., 73,166 man-hours

Farnams plant, Farnams, Mass., U. S. Gypsum Co., 67,612 man-hours

Buffalo plant, Buffalo, N. Y., Kelley Island New York Corp., 49,425 man-hours

Employees at these 23 lime operations worked 3,866,628 man-hours without a disabling work injury. This total of man-hours of operation represented nearly 40 percent of the 9,767,369 man-hours worked by the 57 plants that participated in the 1959 event. Director Marling J. Ankeny of the Bureau of Mines said:

"The perfect records of these plants clearly indicate that employees and management cooperated in effective day-to-day safety programs."

Although 23 plants had injury-free records in 1959, the frequency and severity of injuries among non-winning plants were higher than in recent years. The injury-severity rate of 2,282.191 was the highest since 1953, but was lower than the overall rate of 3,073.577 for the 25 years of the contest. The frequency of injury occurrence—13.719—was higher than the rate of 12.584 for 1958, but still was 44 percent lower than the 25-year overall rate of 24.381.

The 57 participating plants worked 9,767,369 man-hours and sustained 134 injuries. Of these, 3 resulted in fatalities, 2 in permanent partial injuries, and 129 in temporary total disabilities. The increased severity rate resulted from the 3 fatalities and the more severe temporary injuries.

Of the four groups of plants into which the competition is divided, the injury-frequency rate was lowest for underground mines with calcining plants and highest for quarries with calcining plants working less than 100,000 man-hours. The injury-severity rate was lowest for the group that showed the highest frequency of injuries and highest for the group of calcining plants only.

Falls of persons, handling materials other than rock, burns, falling objects, haulage, and machinery were the six leading causes of injuries at the 57 competing lime plants in 1959, accounting for 69 percent of all injuries with stated causes. The most severe injuries occurred from falls and slides of rock which caused 1 fatal and 7 temporary total injuries.

The next most severe cause was in the machinery classification. This was followed by falls of persons. These three causes, each responsible for a fatal injury, caused 20,130 days of lost time or 90 percent of all days lost from injuries at the 57 plants in the 1959 competition.

The 57 lime plants in the 1959 National Lime Association Safety Competition were distributed in 22 states, as follows: Ohio, 10; Missouri, 7; Pennsylvania, 6; Illinois, Nevada, Texas, Virginia, and Wisconsin, 3 each; California, Massachusetts, Utah, New York, and West Virginia, 2 each; and Alabama, Arizona, Iowa, Maryland, Michigan, Minnesota, Oklahoma, Oregon, and Tennessee, 1 each.

The annual competition, sponsored by the National Lime Association and conducted by the U. S. Bureau of Mines, is open to any plant that produces lime or dead-burned dolomite of which all or a portion of the resulting product is sold commercially.

Applications for enrollment and rules governing the competition can be obtained from the Branch of Accident Analysis, Division of Health and Accident Prevention, Bureau of Mines, U. S. Department of the Interior, Washington 25, D. C.

Enter 33 on card, page 145 ➔

It's a fact...

ALLIS-CHALMERS
TRACTOR
LOADERS

give you

6

big bonus features...

ON

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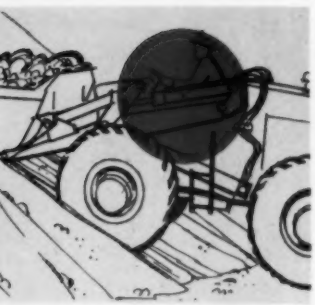
p

NLY THE TL 14 TL 16 TL 20

safe dump cylinder location

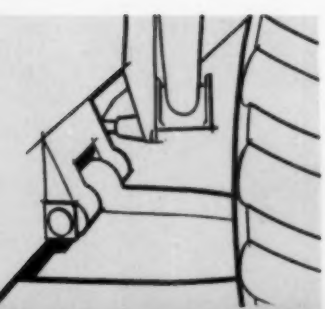


One "common sense" advantage that pays off is the safe dump cylinder location. The TL-14, 16 and 20 have cylinders located up and away from abrasives ... out of grit that scores piston rods and damages hydraulic components. By mounting cylinders away from the bucket Allis-Chalmers loaders lift more pay load . . . less dead weight.

extra lift and reach

The "Big Three" give you more *usable dumping height and forward reach* than units of comparable size. Because Allis-Chalmers measures loader reach from tires, you are assured of *effective reach* . . . reach that pays off when loading high-body trucks. The TL-20, for example, gives you a foot or two of *extra reach* for faster loading with less chance of damage to truck or loader.

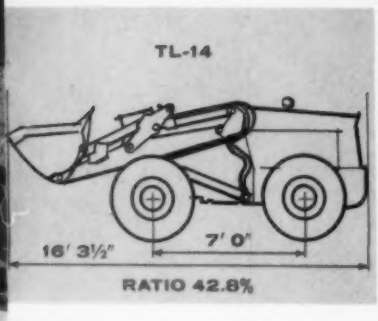
pin-connected axles



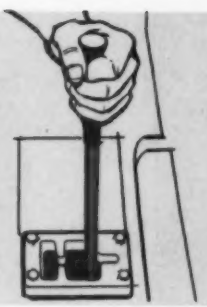
Axles on Allis-Chalmers "Big Three" loaders are pin-connected directly to the frame with 2-inch diameter steel pins ... not automotive-type, U-bolt connections. In rough going, these units stay solid . . . axles do not roll or shift under load.

OFFER ALL OF THESE PROVED ADVANTA

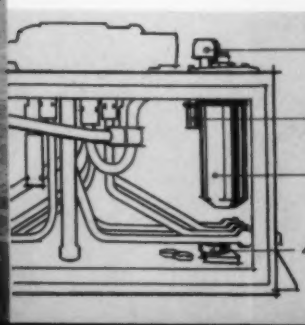
unmatched st



full control ri



5-way hydrau



TAGES

stability

All three models offer higher wheelbase to length ratio for added overall stability. The kind of stability that lets you carry big loads at higher speeds over rough terrain . . . without tipping or spilling the load. Operators work with confidence on tricky loading operations, slope and stockpile work.

right in your fist

Exclusive single-lever control lets you go into and out of any speed, forward or reverse, with just a quick swish of your hand. Allis-Chalmers "one-stick" control makes fast work far easier by taking the time loss out of gear selection. Operators keep working at full capacity all day long.

aulic filtering protection

Only Allis-Chalmers tractor loaders provide 5-way protection for the hydraulic system. Air is double filtered by: *1. air breather* *2. air filter.* Hydraulic oil is cleaned by: *3. full-flow micronic filter* *4. conical screen*, and *5. magnetic filter.* Complete filtering protection means peak operating efficiency . . . extended life. Filters are easily accessible for cleaning and replacement.

1

2

3

and 5

YOU'LL "REALLY GO" WITH T

5,300-lb

TL 14

7,000-lb

TL 16

9,000-lb

TL 20

THE "BIG THREE"

b carry capacity . . . 1 to 3-cu-yd buckets

For all-out savings, the TL-14 with *Tractomatic* transmission is the machine for you. On short-haul loading or stockpiling your operator selects the best working gear. By flipping a lever on the steering column, he goes forward or reverse without shifting gears. *For all-out production* on long hauls or scattered jobs, the TL-14 with full-power shift transmission fits the bill. Operators move from any one speed to any other . . . forward or reverse . . . on the go.

lb carry capacity . . . 1½ to 4-cu-yd buckets

The TL-16 is big enough for real production work . . . yet compact enough for hit-and-run assignments. It features the same design, construction and operating advantages found in the bigger TL-20. This unit handles the same kind of work as the TL-20, but on smaller scale operations. On all jobs, you can count on the "16" for fast, efficient service day in, day out.

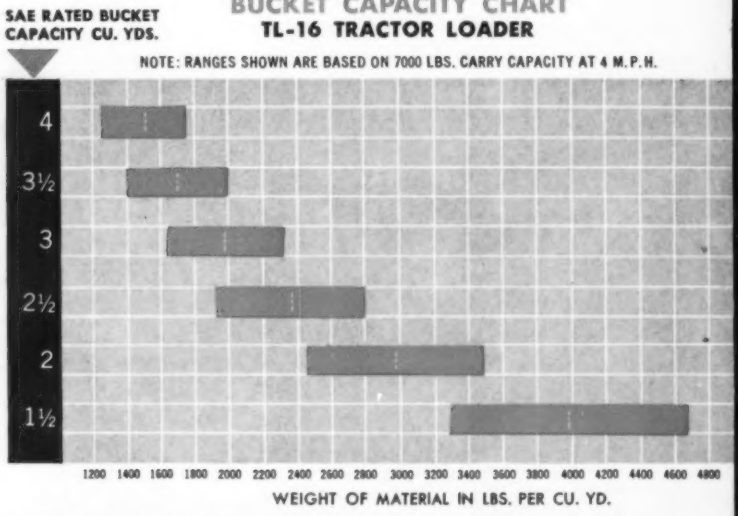
lb carry capacity . . . 2¼ to 5-cu-yd buckets

The 130-hp TL-20 is built for big, tough excavating and loading on construction, mining, quarrying or public works projects. Its many bonus features let you get more work done . . . easier. For example, the extra reach you get lets the TL-20 load big trucks faster and higher than other machines of comparable size.

YOU choose the bucket best suited to your needs...

Allis-Chalmers offers 18 buckets for these 3 models. The TL-14, TL-16 and TL-20 all provide 6 different bucket choices. You pick the best bucket size according to the *carrying capacity of the loader*, the *weight of material you handle*, and the *working conditions in which you operate*. Your Allis-Chalmers dealer will help you select the best profit-making tractor-bucket combination.

This TL-16 bucket chart shows how bucket sizes can be determined:


SAE RATED BUCKET CAPACITY CU. YDS.
BUCKET CAPACITY CHART
TL-16 TRACTOR LOADER
NOTE: RANGES SHOWN ARE BASED ON 7000 LBS. CARRY CAPACITY AT 4 M.P.H.
4
3½
3
2½
2
1½
1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000 4200 4400 4600 4800
WEIGHT OF MATERIAL IN LBS. PER CU. YD.

TO SELECT CORRECT BUCKET CAPACITY FOR ANY OPERATION YOU MUST KNOW; 1, THE WEIGHT OF MATERIALS TO BE HANDLED AND 2, THE CONDITION OF THE OPERATING SURFACES.

Your Allis-Chalmers dealer will put a tractor loader through its paces on your job. Take a good look at all of the features that make these loaders the best buys on the market. Let him set up a demonstration now. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

move ahead with

ALLIS-CHALMERS

...power for a growing world

Printed in U.S.A.

Radioactive Isotope Cobalt 60 Used to Check Steel Castings

A high point in the observance of 50 years of operation at The Farrell-Cheek Steel Company plant in Sandusky, Ohio, was the management's announcement of the completion of a gamma-radiographic inspection room. This installation is based upon the use of the radioactive isotope cobalt 60 as the energy source in making gamma-ray exposures on film through sections of steel castings.

The program was started in 1938 with a 500-milligram radium capsule as the source of energy. During January, 1957, a General Electric 250-kilovolt X-ray unit was installed to add to the facilities. This unit is usually employed to examine sections up to 2 in. thick. Later (March, 1951), with the advent of isotopes as a source, a 500-millicurie capsule of cobalt 60 was purchased from the Oak Ridge Laboratories of the Atomic Energy Commission.

The newly completed building, which is being used in conjunction with and adjacent to the present X-ray facility, houses a 5.25-curie source of cobalt 60 supplied by Technical Operations, Inc.

Positioning the holding tripod for a multiple exposure of a single casting. A survey meter nearby is used to check for abnormal radiation, as a safety measure.

Cement Industry in India Grows at Significant Rate

India's cement industry (one of that country's major industries) has made significant progress during the last few years, according to the U. S. Bureau of Mines. There are now 36 plants with a total installed annual capacity of about 8.9 million tons. In 1951, annual capacity totaled 3.5 million tons.

When the new cement plants presently under construction go into production, and the expansion programs of existing plants have been completed, installed capacity is expected to increase to 13.7 million tons annually. Target date for this new production figure is 1961.

One reason for the boom is the large quantity of cement required for many large hydro-electric projects, new ports, townships, airfields, roads, factories, hospitals, and schools now under construction in India under the Five-Year Plan.

California Portland Cement To Expand, Modernize Plants

California Portland Cement Company, Los Angeles, has launched an expansion program at its plants at Rillito, Ariz., and at Colton, Calif.

The Rillito plant is operated by a subsidiary, Arizona Portland Cement Company. Improved storage and loading operations will result from new storage silos and loading facilities for truck and rail transportation. A new finish mill and grinding machinery are also being installed.

The Colton plant will get two new kilns with a total capacity of 6,000 bbl. per day, new raw- and finish-grinding departments, 21 storage silos, and bulk-loading facilities for rail and truck loading. A process-control computer will also be added.

New Precipitators Approved For Marquette Cement Plant

Directors of Marquette Cement Manufacturing Company have approved a complete new electrical precipitator installation at the Des Moines (Iowa) plant, along with dust recovery and alkali-leaching facilities.

This equipment is expected to eliminate practically all losses of raw material in the production process, and also remove objectionable alkali concentrations in the recovered material.

Cost of the improvements at the Des Moines plant, along with those previously announced at Milwaukee and Nashville, totals $2,500,000.

Sessions of the 1961 convention of the National Lime Association will be held in Point Clear, Ala., site of the 1958 convention. The dates are May 11-13, and headquarters will be the Grand Hotel.

LESCHEN WIRE PORTER ROPE DIVISION
H. K. PORTER COMPANY, INC.
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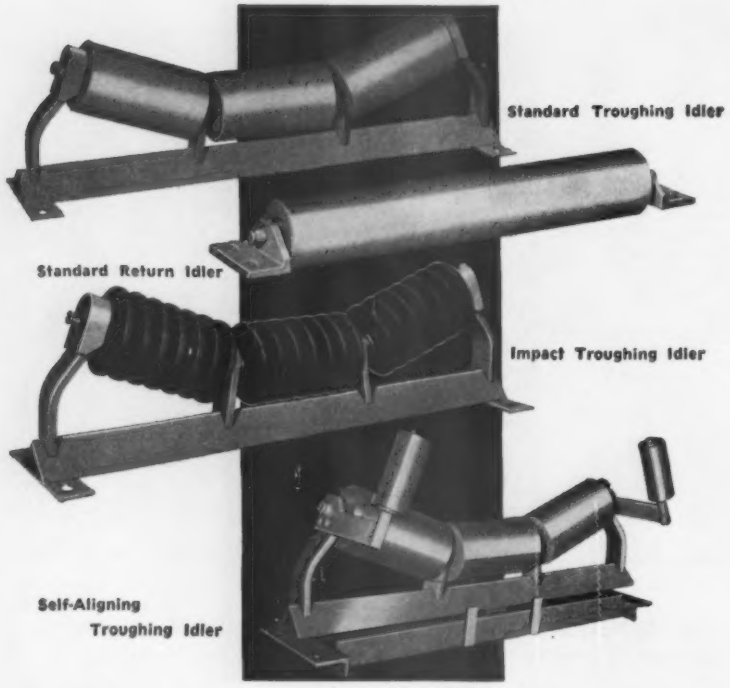


MARCO belt conveyor idlers

INCREASE PROFITS BY HANDLING GREATER LOADS AT LOWEST COSTS...

The advanced engineering ideas incorporated in MARCO conveyor idlers will increase your production and lower your material handling costs.

For example, MARCO idlers have greater load capacity because they are designed with precision ground ball bearings, designed specifically for conveyor idlers. At 300 revolutions per minute, they will carry loads up to 860 lbs. per bearing. These anti-friction bearings give you added years of idler service life and lower power requirements.

Less maintenance: Pre-lubricated, effectively sealed bearings eliminate field lubrication. Self-shedding base keeps material build-up at a minimum. End and center brackets are ½" thick steel, die formed, to eliminate breakage.

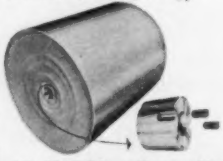
Why settle for anything less than the proven economy and efficiency offered by MARCO idlers? Units fit any conveyor frame and are available in many types and sizes. **Ask for bulletin ID-2.**

MARCO — One source for all your Conveyor Needs

Whether you need a complete conveyor, or any conveyor accessory, there is a MARCO product to meet your exact requirements. By relying on MARCO —you save time, trouble and get more for your dollar.

Get the facts from your MARCO distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

Solid Steel Pulleys
(all-steel, heavy-duty)



All MARCO pulleys offer the outstanding advantages of machined faces and Taper-Lock bushings—at a competitive price.

Self-Cleaning (wing-type) Conveyor Pulleys
(Steel fabricated, jig welded)

Pulley pays for itself many times in longer belt life by discharging 'mis-located' particles before belt can be damaged.

MARCO

*Trademark Reg.

engineered MARCO products:
Tubular Frame Belt Conveyors—Conveyor Idlers—
Solid Steel and Self-Cleaning Steel Pulleys—
Bucket Elevators—Control Gates—Feeders—Bins.

Enter 42 on card, page 145

1959 Engineering Index Issued— "Sample Service" Offered

Publication of the 75th edition of *The Engineering Index* has been announced. The 1,532-page volume, edited by Carolyn M. Flanigan, contains more than 39,000 annotations of articles reviewed in approximately 1,700 publications (English and also foreign languages). The book is published by Engineering Index, Inc., 29 West 39th Street, New York, N. Y. Price, $70 per copy.

All publications indexed are permantly filed in the Engineering Societies Library, also at the New York address. A library card service is available to subscribers on an annual basis. Each card contains a brief abstract which permits the subscriber to determine whether he wishes to read the entire article. He may obtain it in microfilm or photostat form from the Engineering Societies Library. All indexed articles are compiled annually for publication in the bound volume.

Lime Firm Doubles Capacity Achieves Quality Improvement

The Blair Limestone Division (Jones & Laughlin Steel Corp.), Martinsburg, W. Va., has put into operation two new 52- by 12- by 14-ft. gas-fired limestone kilns. Yearly rated capacity is 72,000 net tons of burned lime—a doubling of the plant capacity — with accompanying quality improvement. Product will be used for J&L's steelmaking furnaces at Pittsburgh and Aliquippa, Pa.

Air pollution abatement equipment has been installed in the form of automatic door controls for the kiln. Gas is automatically shut off when a kiln door is opened for charging.

The new kilns replace 11 coke-fired kilns, now dismantled, which had been in operation since 1911. The change has caused sulphur content of the lime to decrease by 20 to 25 percent.

Features of the new kilns include automatic charging of materials, continuous discharge of finished product, conveyor lines for materials handling, automatic controls for movement of product within the kilns, and automatic heating. Blair Division quarries 1,800,000 gross tons a year of limestone and dolomite.

NORTH AMERICAN SOLVES* "DIRTY-BAG" PROBLEM

WITH THEIR NEW KLEEN-PAK RAYMOND MULTIWALL

Cleaner bags, brighter brand identification and cleaner housekeeping in the packing room and warehouse are the benefits received by North American Cement Corporation, and their customers, with their new Kleen-Pak multiwall developed for them by Raymond Bag Corporation. By using known bag manufacturing techniques, Raymond was able to eliminate the messy, trouble causing perforation below the valve, which up to now has been standard on bags used for cement, mortar, and other fine materials. Now, North American, a foremost innovator of palletizing and fast truck delivery, speeds products in a cleaner, more salable package to their customers.

Raymond BAG CORPORATION

Middletown, Ohio — A Division of Albemarle Paper Mfg. Co.

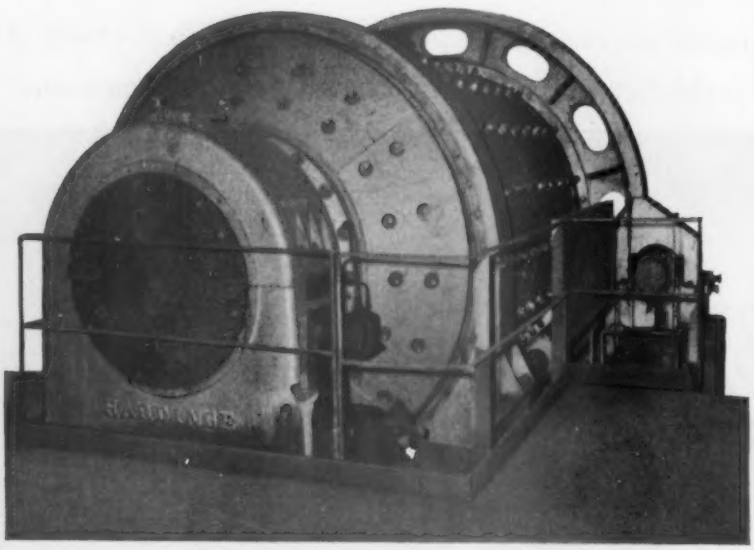
*This is another example of how Raymond Multiwall experience and service pays off for multiwall users. Let a Raymond Representative serve you.

Maker of RUGGED Multiwall Packaging for Industry • Atlanta • Baltimore • Chicago • Kansas City • Louisville • New York

looking toward
IMPROVED PRODUCTION
... look to Hardinge !

Hundreds of Hardinge Rod Mills are in use on such widely divergent applications as the reduction of aggregate, coke, abrasives, metallic and non-metallic ores, and the preparation of concrete sands. Mill sizes range from 2 feet to 12 feet shell diameter and up to 1500 Horsepower. They are available for either wet or dry grinding, arranged for trunnion overflow, or peripheral discharge (end or center). The conical heads of Hardinge Rod Mills provide a feed pocket to allow the charge to enter the rods without over loading or "choking." Ask for catalog No. 25-C-8.

HARDINGE ROD MILLS



An 8½' diameter by 12' long Hardinge Conical-Head Rod Mill grinding coke. Note the end peripheral discharge hood, starting lubricator and water-cooled bearings.

HARDINGE
COMPANY, INCORPORATED
Main Office and Works • 240 Arch St., York, Pa.
"Hardinge Equipment—Built Better to Last Longer."

NEW YORK
TORONTO
CHICAGO
HIBBING
SALT LAKE CITY
SAN FRANCISCO
HOUSTON
LAKELAND
BIRMINGHAM

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Industry Personalities

J. R. Wilson

JOHN R. WILSON has been appointed associate engineer on the joint engineering staff of the National Sand and Gravel Association and the National Ready Mixed Concrete Association in Washington, D.C. Mr. Wilson recently received his Master of Science degree in civil engineering from the University of Maryland under the sponsorship of the Stephen Stepanian Fellowship of N.R.M.C.A.

He served as field engineer for the Raymond Concrete Pile Company and was subsequently in the bridge design section of the Chesapeake and Ohio R.R.

WILLIAM N. KOPENHEFER, chief chemist at the Oro Grande, Calif., plant of the Riverside Cement Company, has been named superintendent of Riverside's new white-cement plant at Crestmore, Calif.

G. C. CARTER has been promoted to the post vacated at Oro Grande by Mr. Kopenhefer.

CHARLES LINDGREN, sales representative for Calaveras Cement Company, has been transferred from Fresno, Calif., to Eugene, Oreg. The firm recently opened a bulk cement transfer plant in Springfield, Oreg., to serve 12 southern Oregon counties.

PHILIP L. HOFF has been named sales engineer for the Marquette Cement Manufacturing Company in the St. Louis district office. He was assistant engineer of materials for the Missouri State Highway Department prior to joining Marquette.

WILLIS FRANK is now superintendent of the Sodus (N.Y.) plant of the General Crushed Stone Company, succeeding GLEN RANSIER, who has retired after 39 years of service with the company. Mr. Ransier became superintendent of the Sodus plant in 1952.

L. S. Campbell

LLOYD S. CAMPBELL has been named vice-president of Michigan Limestone, a division of United States Steel Corporation. The announcement was made by CARL G. HOGBERG, who was recently named president of Michigan Limestone. Mr. Campbell was previously assistant to the vice-president of operations of Oliver Iron Mining, another U. S. Steel division.

A series of appointments in the sales organization of Columbia Cement Corporation has been announced.

JOHN R. PINNICK JR., formerly contract sales representative for the Zanesville, Ohio, cement plant, has been appointed assistant sales manager in charge of highway sales.

JOHN K. BROWN has been named district sales manager for the Columbus, Ohio, office, where he had served as sales representative since 1954. In his new position he will be in charge of cement sales from the firm's Zanesville plant.

EUGENE P. O'BRIEN has been appointed district sales manager at Cleveland, Ohio, where Columbia Cement will establish a district office. Mr. O'Brien will be responsible for sales from the company's Barberton, Ohio plant.

CLEMENT J. MERTES has been named assistant sales manager for the Cleveland district but will continue to maintain his headquarters in Massilon, Ohio.

Columbia Cement Corporation will transfer its general sales offices from Zanesville to Columbus, where a new headquarters building is under construction.

R. L. Pizer

RALPH LEE PIZER has been appointed vice-president and assistant to DAVID S. FISCHMAN, chairman of the board, for Sayre & Fisher Company, Sayreville, N.J. He has also been placed in charge of labor relations. Mr. Pizer, who joined the company four years ago, has most recently headed the purchasing, public relations, and real estate departments. The firm operates Sayre & Fisher Sand Company and Sayre & Fisher Aglite Company.

The Portland Cement Association is establishing a new regional office and a new district office.

The states of Oklahoma, Arkansas, Louisiana, and Texas are being joined together in a new South Central Region, with headquarters at Austin, Tex. The new district office

T. D. Shiels

E. D. Thorson

is being established at Albuquerque to serve New Mexico.

THOMAS D. SHIELS, district engineer for the last five years at the Austin office, has been named regional manager of the South Central Region. He joined the association in 1925 as field engineer for the Dallas district.

TED L. EDWARDS has been named to succeed Mr. Shiels as district engineer in Texas. Mr. Edwards has been with the association since 1946, serving first as field engineer.

The Rocky Mountain Region, with headquarters in Denver, will now be supervised by a full time regional manager, EDWARD D. THORSON. Mr. Thorson had been responsible for both the Denver district and the Rocky Mountain Region. He has been with the association since 1934.

BERNARD C. SMITH has been appointed as the new district engineer for New Mexico, and will headquarter in Albuquerque. He joined the association in 1953.

JACK Y. BARNES has been named to succeed Mr. Thorson as district engineer for Colorado and Wyoming, with offices in Denver. He has been with the association since 1937.

NORMAN D. BAUMGART has been appointed to succeed Mr. Barnes as district engineer for Montana, with offices in Helena. Mr. Baumgart joined the association in 1952.

F. NORMAN ANDERTON, former secretary-treasurer and director of Birmingham Paper Company, has been named treasurer of Vulcan Materials Company by the board of directors. At the same time, JOHN V. VAN PELT III, vice-president, treasurer, and controller, was elected vice-president, finance, and controller.

COL. HENRY CROWN, chairman of Material Service, a division of General Dynamics Corporation, was present at commencement ceremonies June 16 at Tri-State College, Angola, Ind., for the vestmental ceremony and the actual conferral of the honorary degree, Doctor of Engineering awarded him *in absentia* in 1955 by the college.

JAMES T. WAKLEY, active in the sand and gravel industry for the last seven years, has been named president of Iron City Sand and Gravel Company and the Vang Ready Mixed Concrete Company, both of Pittsburgh. He is a former executive vice-president of the firms.

RICHARD F. GARMAN has been named Ohio district sales manager for the Dundee Cement Company of Dundee, Mich. Mr. Garman will make his headquarters in Cleveland. Previously he was sales manager of a large Cleveland building supply firm.

Their aim: *to double production without increasing overall loading costs.*
Solution: *this 4½ yd Michigan Tractor Shovel. Its regular time-record:*

60 SECONDS TO LOAD

At the Oneglia & Gervasini pit near Woodbury, Connecticut, they are loading trucks in *half the time* it ever took before!

Overall loading *costs*, nevertheless, have stayed practically the same!

Reason for this production-doubling, cost-cutting record is the 4½ yard Model 275A Michigan Tractor Shovel shown on these pages. This unit has *1½ times the bucket capacity* of the most commonly-used size of mobile Tractor Shovel. Its speed of loading has been remarkable . . .

Heaps small trucks in 20 seconds, 20 yard semi-trailers in 2 minutes

Working mostly with 10 yard, 10 wheel trucks in this 1,000-ton-per-day traprock quarry, the Model 275A has established an average load cycle of only 60 to 70 seconds —*from first pass into a stockpile 'til loaded truck pulls away.* "On our busy days," reports Supt Theodore Tietz, "we move 10-yard trucks out of our pit at the rate of one per minute." Smaller trucks generally require only 20 to 30 seconds (one pass) to load. Twenty to 24 yard semi-trailers usually take 2 to 2½ minutes (four or five passes). These records cover two years of operation and all grades of crushed stone, all kinds of weather. In one typical time-and-motion study, for example, the Model 275A regularly dug into a half-frozen stockpile of 1½ inch stone and backed off with a heaping 4½ yard payload *in only 7 seconds!*

Carries 5 ton load up 35° slope

High-speed loading like this has been *only one* of Michigan's important achievements. The 262 hp rig has taken over some tough stockpiling chores too. Like moving two-inch stone to the top of a 100 ft high stockpile. The last 60 feet of ramp to piletop here is pitched *at a 35-degree angle*—yet the Michigan regularly carries a heaping *5 ton load* up it. Back-dragging on the return trip accurately spreads and compacts a 4 to 5 inch layer of gravel to keep the ramp graded for continuous dumping.

"I particularly like Michigan's bucket action. Even in frozen stone, you can push in and get a full load without straining"—Operator Bob Faccin.

SPECIFICATIONS		
	Model 275A	Model 375A
Bucket capacity (standard SAE ratings)	4½ yards	6 yards
Lifting capacity	22,000 lbs	30,000 lbs
Weight	46,000 lbs	61,000 lbs
Speeds (forward and reverse)	0-28 mph	0-25 mph

Seven other standard Michigan Tractor Shovel models, 16 cubic feet to 2¼ cubic yards (SAE bucket ratings), are available.

"This big Michigan effectively dresses stone stockpiles. Its 10'8" wide bucket makes it an excellent snow plow. It even does well on such tough dozer jobs as shovel cleanup and stripping quarry top prior to drilling"—Supt Theodore Tietz.

EACH 10 YARD TRUCK

Moves 11 ton boulders

Michigan handles "super-lifting" assignments too that smaller Tractor Shovels couldn't touch. Rip-rap, for example. Some of the traprock boulders uncovered in the Oneglia-Gervasini pit weigh 10 or 11 tons! The Michigan makes short work of stockpiling or loading them into trucks. "In fact," says Supt Tietz, "the Michigan frequently in the past 2 years has moved rocks our quarry shovel couldn't handle!"

Model 275A easy to maintain

One reason O & G's Michigan performs so well on all these tough jobs is its all-Clark power train . . . Clark torque converter, power-shift transmission and planetary wheel drive axles . . . all matched to each other . . . all designed to the same general specifications as the Clark components which have proved so efficient in the 15,000 smaller Michigan Tractor Shovels sold since their introduction in 1954. Also, some credit for Michigan's good performance here should be given the simple, systematic maintenance procedure followed. About half an hour a day takes care of lubrication as well as oil, water and torque converter oil check. Once a week engine oil and air filters are changed. "It's an easy machine to service," says Operator Bob Faccin, "and we feel the time is well spent."

If you load trucks, we honestly believe *your* time will be well spent on a study of the big Michigans. Both the 4½ yard Model 275A, described here, and the bigger 6 yard Model 375A are now proved by over two years in the field. Both are in regular production and readily available. See your local Michigan Distributor for details on performance . . . price . . . and delivery!

CLARK EQUIPMENT

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 27, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

Enter 46 on card, page 145

At pug mill, Michigan Dozer moves 550 tons hourly up to 150 feet.

Major Southern quarry chooses Michigan Tractor Dozer for top-production job

375 hp model feeds 550 tons hourly to pug mill

Same unit also handles shovel and blast cleanup in pit ½ mile from mill.

At its top rate, this Michigan Tractor Dozer moves 550 tons of crushed stone an hour!

Pushes, one-way, range up to 150 feet.

Same unit also cleans spillage around two rock shovels located ½ mile away.

It alone does the work of two 50,000 lb class crawler dozers.

Owner: Lambert Brothers Division of Vulcan Materials

The Dozer is a 375 hp, 74,000 lb Model 380 Michigan. It is owned by Lambert Brothers Division of Vulcan Materials Inc, Birmingham, Alabama, one of the nation's largest stone pro-

Enter 48 on card, page 145

New Michigan Tractor Shovel, latest of 15 owned by Lambert, truck-loads 3,500 tons daily

One of Lambert Bros 15 Michigan Tractor Shovels. This unit, a new Model 175A with 3¼ yd bucket, handles all truck-loading, also dresses stockpiles in Lambert's Nashville quarry. It loads 200 to 250 trucks, 3,000 to 3,500 tons per 8-hour day. Each pass—2700 lb/yd 3" stone down to —100 filler dust—averages 4 tons, each load cycle takes 20 to 30 seconds. Unit works out of 25 stockpiles, scattered over 100 acres. Furthest run is ¾ mile—easy for the Model 175A's fast rubber-tired speed of 27 mph.

ducers. The Lambert Division alone operates 25 quarries in Tennessee, North Carolina, Kentucky, and Virginia; they are using this Dozer in their 80 acre pit near Nashville.

The story starts last summer. Harold and Glen Lambert had just installed the pug mill and needed something to feed it. Their existing crawler dozer wouldn't do; it obviously didn't have the mobility to do both pit cleanup and mill feeding. Another big *crawler* would be needed, it seemed. Then Nashville distributor McCarthy, Jones & Woodard suggested a rubber-tired Michigan Tractor Dozer. One was tried. The problem was solved. From four available sizes, a 375 hp model was chosen as best suited to the need (the other size Michigan Dozers: 162, 262, and 600 hp).

Main jobs: feed mill, clean around shovels

The 375 hp machine has been busy ever since.

Most of the time it works at the pug mill—dozing out into a stockpile from the feeder belt when the mill isn't running—feeding when the mill is running at a higher rate than available plant production (half or more of the crushed rock is fed into trucks and hauled to regular stockpiles).

Four to eight times a day, the 25 mph Michigan leaves the mill and drives down blacktopped roads to the quarry for shovel cleanup. Unit makes the ½ mile trip, which took crawlers 20 minutes or so one-way, in 2 to 3 minutes.

50% cut in shovel cleanup time

In the pit, the Michigan saves more time (and money). Back in Lambert Brothers crawler days, a good operator could clean the spillage around one shovel in 5 or 6 minutes. Today, their high-speed Michigan does each cleanup in 2 to 3 minutes.

50% cut in blast cleanup time

Another example of time saved is in blast cleanup. Once or twice a week, Lambert's crew shoots the 90 ft high quarry face. Each blast breaks about 22,000 tons of limestone, throws some rock as far as 600 ft. Used to take a crawler 45 minutes to an hour of full-time work to police the area. Now, the Michigan Tractor Dozer cleans up in 20 to 30 minutes.

Sound worthwhile for *your* job? Why not check first-hand? Drop us a line—or call—we'll show you a Michigan Tractor Dozer in action so you can judge for yourself.

Travel speed, job to job over pavement, reaches speeds of 25 mph.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

2479 Pipestone Road
Benton Harbor 18, Michigan

In Canada:
Canadian Clark Ltd.
St. Thomas, Ontario

ALL NEW... G-900 TRACDRIL!

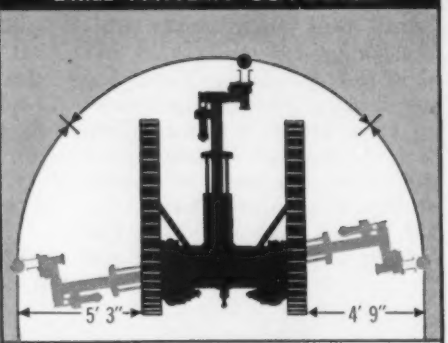
Unmatched versatility . . . drill boom is swung at right angles to tracks and drill carriage tilted inward for steeply sloped conditions.

The all new Chicago Pneumatic G-900 Tracdril is the culmination of 5 years of research and wide field experience. This self-propelled drilling unit is maneuverable, rugged and productive . . . a real *"drillers drill."* Extra large drilling radius because of its 180° horizontal boom swing and dual controls on turret and boom end for quick, accurate positioning of boom and drill carriage give the driller exceptional flexibility.
With the sensational 4½" Deep Hole Drill, it quickly sinks 3" holes up to 75 feet.

6 MAJOR EXCLUSIVES OF CP TRACDRILS

❶ **"Boarding house reach"** lets the drill carriage stretch out 63" beyond tracks to drill true verticals alongside the unit. ❷ **Extra-long Oliver tracks,** specially designed, provide stabilizing ground contact of 1350 square inches. ❸ **Sure-footedness and maximum traction** are assured with five lower track wheels. ❹ **Seven labor-saving hydraulic cylinders** ease driller's muscle work, give fluid-smooth action. ❺ **Two sets of grouped controls,** at turret and boom end, save time and steps for driller, boost footage. ❻ **"Dead man" automatic brakes** that slam on when tramming throttle is closed, locking unit on steepest slopes or bad ground.

NO EQUAL FOR DRILL PATTERN COVERAGE



- **Full 180° Ground Coverage** . . . right or left. New G-900 drills true verticals at 90° angle to tracks.

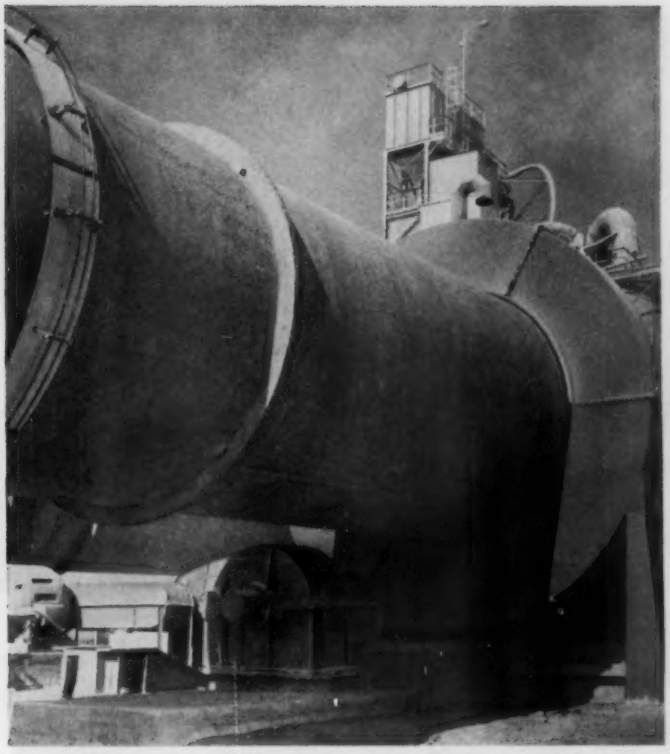
- Reaches "way-up" for extra high horizontal breast holes . . . to 11 feet.
- Big 85° carriage swing compensates for steeply sloped conditions.
- Keeps snake holes "way-down" and properly inclined . . . no interference from feed motors or crawler carriage structural members.

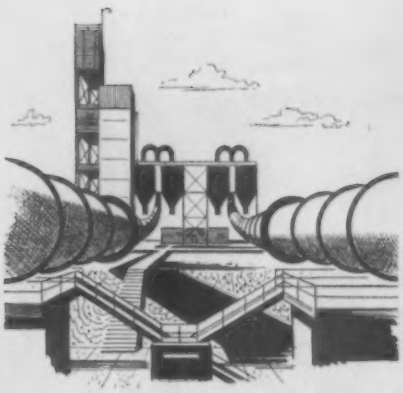
Full specifications and details in Bulletin SP-3627

Chicago Pneumatic

8 East 44th Street, New York 17, N. Y.

AIR COMPRESSORS • PNEUMATIC AND ELECTRIC TOOLS • AIR-BLAST BITS • DIAMOND DRILLS • REICHdrills • ROCK DRILLS

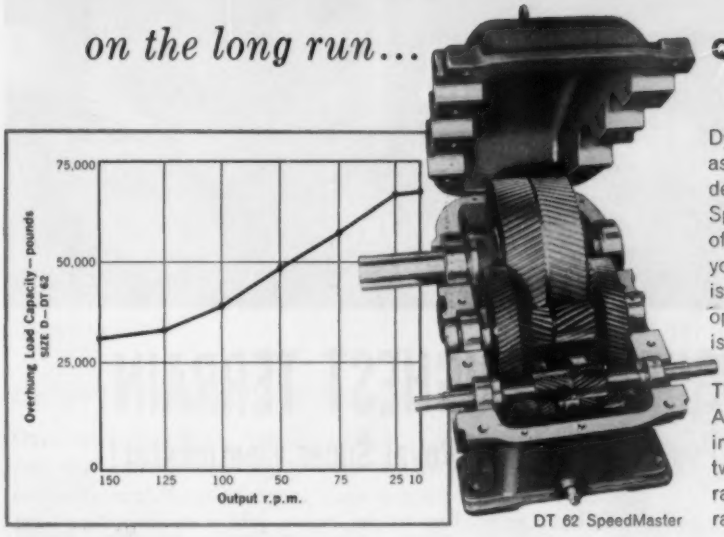




At a cost of 3.2 million dollars, Riverside Cement recently expanded its Oro Grande plant to increase clinker capacity by one million barrels annually. To achieve this, 5 smaller kilns were replaced with two 12′ x 310′ Allis-Chalmers rotary kilns. Western Gear SpeedMaster DT 62 parallel shaft speed reducers, driving these kilns, will help do the job.

on the long run...

QUALITY COSTS YOU LESS!



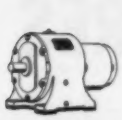
DT 62 SpeedMaster

Dynamic peaks from non-uniform loading such as with kiln drives, and heavy overhung load demands are common requirements for the SpeedMaster. Check the overhung load capacity of this DT 62 on the curve to the left to see for yourself one good reason why the SpeedMaster is a familiar sight on such key drives where operation is vital. Heavy overhung load capacity is a standard feature on every unit.

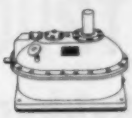
The DT 62 SpeedMasters are rated at 156 hp, AGMA Class I, with a ratio of 80.08 to 1 and an input speed of 1200 r.p.m. Auxiliary drives use two Western Gear BH 109 spiral bevel units rated at 16.3 hp, AGMA Class I, with a 17.23 to 1 ratio and an input speed of 1500 r.p.m.

WG INDUSTRIAL PRODUCTS DIVISION

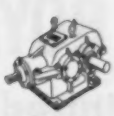
OTHER WESTERN GEAR POWER TRANSMISSION PRODUCTS


INTEGRAL GEARMOTOR

PARALLEL SHAFT REDUCER


VERTICAL SHAFT REDUCER

HIGH SPEED UNIT


RIGHT ANGLE REDUCER

WESTERN GEAR CORPORATION
Industrial Products Division
P.O. Box 126, Belmont, California

Please send me SpeedMaster Bulletin 5802

NAME_____
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CITY_____ STATE_____

TAME THE ROUGHEST, TOUGHEST TERRAIN

with Safety Steel Shield Protection of U.S. Royal Super Fleetmaster!

You know how tire failure can hold up trucks, crews, jobs. Cut down time—get the U. S. Royal Super Fleetmaster. This tire's *Safety Steel Shield* forms a virtually impenetrable barrier against cuts and ruptures. Its *Double-Strength Nylon* is twice as strong as ordinary nylon. This double-armored protection gives you brute strength that defies vicious off-road impacts, yet gives unmatched stamina for long hauls at highway speeds. Call your U. S. Royal Dealer right away!

U.S. ROYAL SAFETY 1ST TRUCK TIRES

United States Rubber

Rockefeller Center, New York 20, N.Y.

Enter 52 on card, page 145

Enter 53 on card, page 145 ➔

EXPANDA-KRAFT (newest, high-strength H&W bag stock) stops a Johnny Unitas pass

Johnny Unitas, all-pro quarterback, throws fast and hard and straight. We asked Johnny to help us demonstrate the strength and resilience of Expanda-Kraft. He had two targets: regular multiwall kraft and Expanda-Kraft. Each target had four plies of 50-lb. stock. The speeding pigskin ripped through regular kraft, but time after time it bounced off Expanda-Kraft. The picture shows where the ball left dents in the Expanda-Kraft.

Multiwall bags made of Expanda-Kraft:

Reduce breakage—Expanda-Kraft bags have two-way stretch, soak up shocks that would break ordinary kraft bags of equal basis weight.

Stack securely—They stack with less risk of slippage and stay in place while in transit, because of improved friction coefficient when compared with regular kraft bags.

Withstand moisture—Weathering and high humidity have little effect. They stay tough. Firm.

Print sharp—Their attractiveness increases your product's sales appeal. Expanda-Kraft White is unusually bright and takes fine printing beautifully. Semi-bleached and Natural shades do, too.

Fill fast—Expanda-Kraft bags have high porosity. And they're rigid enough to stand up to high production speeds on the filling line.

Expanda-Kraft, made by a new roll-crepe process, withstood the terrific impact of these Johnny Unitas bullet passes. It combines rigidity and moisture resistance with uniform toughness. Expanda-Kraft is available to multiwall bag manufacturers in 40, 50, 60, 70 and 80-lb. basis weights. Expanda-Kraft bags have proved their superiority over regular kraft bags in standard drop tests.

Expanda-Kraft is superior to regular kraft in impact test. These bags were filled with sand, suspended on long ropes, released and collided in mid-air. Only the regular kraft bag burst, yet it had the same ply construction as the Expanda-Kraft bag.

Contact your multiwall bag supplier for more information. Or, write *Hollingsworth & Whitney, Division of Scott Paper Company, Chester, Pennsylvania.*

SAFEGUARD YOUR PRODUCT IN EXPANDA-KRAFT*

*T.M. Scott Paper Company

HOLLINGSWORTH & WHITNEY DIVISION OF
SCOTT PAPER COMPANY

PRINCIPAL ADVANTAGES

1. Rugged construction and slow speed insure utmost dependability and minimum maintenance.
2. Whizzer separator gives a wide range of fineness with finger-tip control.
3. Automatic feed control assures maximum capacity — with only part of one man's time required for the mill operation.
4. Combined operations of pulverizing, classifying and conveying offer economies and simplification in plant design.
5. Flexibility of layout.
6. Dust-free operation.

For further details, write for the Raymond Roller Mill Catalog #79Q.

THIS huge 66" Raymond Roller Mill is the *heart* of the modern equipped plant of the Federal Foundry Supply Division of Archer-Daniels-Midland Company at Colony, Wyoming.

The raw bentonite is first reduced in a slicer ahead of an 8' diameter by 60' long rotary dryer where the moisture is reduced from 30% down to 8%-10%.

The Raymond Roller Mill then pulverizes, classifies and conveys the finished material to storage silos, where the product can go to bag packers or bulk loaders.

This Super Roller Mill has a rated capacity of 500 tons per day at a fineness of 90% minus 200 mesh. It can produce various grades, with classification easily controlled over a wide range.

Archer-Daniels-Midland Company has incorporated automatic control features in the system to permit operation of the entire plant by two men on a shift.

COMBUSTION ENGINEERING, INC.

427 West Randolph St.
CHICAGO 6, ILLINOIS

Raymond Division

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

EATON 2-SPEED TANDEMS

give you all the advantages of BOTH

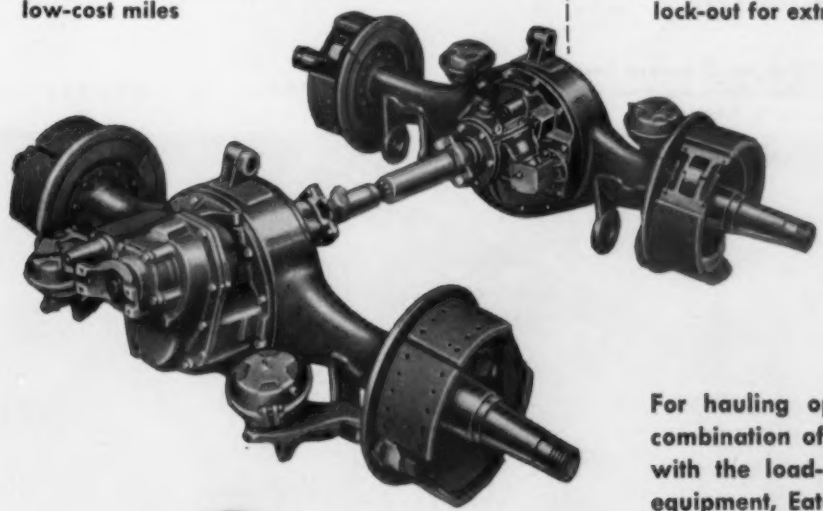
EATON 2-SPEED AXLES

- ★ *Double* the conventional number of available gear ratios
- ★ Power when you need it; speed when you want it
- ★ Engine operation within the most efficient, economical speed range
- ★ Low stress and wear on axle, clutch, transmission, and drive line
- ★ Simple, low-cost maintenance
- ★ Long truck life; thousands of extra low-cost miles

and

EATON TANDEM DRIVES

- ★ Short over-all length; maximum strength with minimum weight
- ★ Simplified design; few parts; easy, low-cost maintenance
- ★ Most parts interchangeable with standard Eaton 2-Speed Axles
- ★ No need to match tires; Eaton's inter-axle differential eliminates wheel-fight
- ★ Power equally transmitted to both axles
- ★ Driver-controlled inter-axle differential lock-out for extra traction when needed



Wide range of capacities. Eaton Tandems are also available in Single and Double Reduction types.

For hauling operations which require a combination of speed and power together with the load-carrying ability of tandem equipment, Eaton 2-Speed Tandems make big savings in hauling costs. Ask your truck dealer to tell you about the many exclusive profit-building features you get only in Eaton 2-Speed Tandems.

EATON

AXLE DIVISION

MANUFACTURING COMPANY

CLEVELAND 10, OHIO

MOUNTAIN-MOVING BELT CONVEYORS IN 12th YEAR WITH ORIGINAL IDLERS

Barber-Greene conveyor system still going strong after handling up to 830,000 tons yearly for Blue Ridge Stone Corp.

The Blue Ridge Stone Corp., Roanoke, Va., is blasting, trucking, crushing and conveying away a limestone mountain at the rate of up to 830,000 tons yearly.

After trucks make the short haul moving blasted rock from face to primary crusher, a 4-flight, 4,150-ft. Barber-Greene conveyor system hustles the limestone from quarry floor to finishing plant.

President Abney Boxley observes, "We've increased production more than 30% over our old all-rail haulage method.

"Since our Barber-Greene conveyors became operative in 1948, we've had 12 years of dependable service with minimum maintenance and downtime. Practically all 1,500 original idlers are still in service and belt life has been extremely good.

"By including a 6,000-ton surge pile ahead of the No. 4 conveyor, we can operate the plant for

6,000-ton surge pile at end of 700-ft. No. 3 conveyor keeps finishing plant operating 24 hours after quarry shut-down. Rock is reclaimed on 1,600-ft. belt leading to finishing plant.

After double reduction of stone in quarry, limestone gets fast ride upgrade on 30" belt of 1,600-ft. Barber-Greene Conveyor enroute to surge pile and then to finishing plant. 4-flight system totals 4,150-ft.

as long as 24 hours after quarry operations have stopped if we bulldoze the stockpile."

Get this same lowest-cost-per-ton-mile solution to your material handling problems by calling your Barber-Greene Conveyor Specialist. He sells pre-engineered and pre-aligned standardized conveyors plus broad design experience . . . a combination that is preferred throughout the aggregate industry for hard-dollar reasons.

Send For New Idler Bulletin

New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

Your belt conveyor equipment headquarters

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.
Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia

CONVEYORS • LOADERS • DITCHERS • ASPHALT PAVING EQUIPMENT

Finishing plant is last processing point for stone after 4,150-ft. conveyor ride from quarry. Short conveyor loads truck-loading hoppers. Bulk of output is loaded into railroad cars shown on siding.

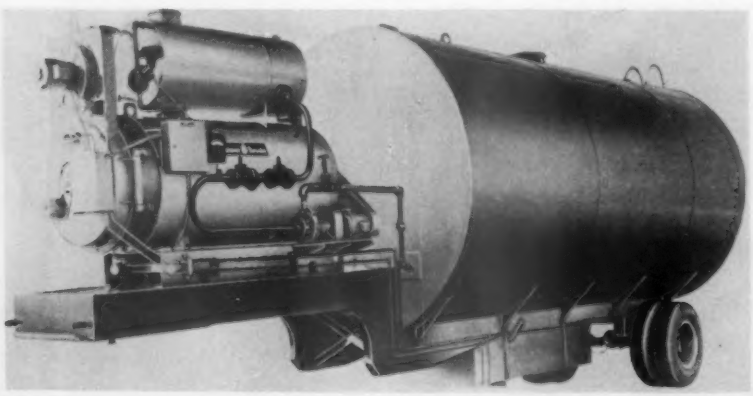
● A compact 8-in. dredge has been added to the line of the Ammco division of American Marine and Machinery Company, Incorporated.

Because of its ladder and hull construction this unit is capable of digging to depths of 40 to 50 ft. It can be trucked over highways by removing the two front pontoons, and then can be easily assembled on the job in one day.

The new hydraulic drive system gives twice the power for the variable speed swing and cutter. All machinery is fingertip-controlled from the cabin. According to the manufacturer, the unit has 80 percent less moving parts, and 80 percent less maintenance.

The dredge can be used for sand and gravel recovery or filling.

Other units in the "Hydra-Drive" line offered by the company include portable dredges in sizes from 6 in. to 20 in. **(350)**



● A portable packaged unit that heats and stores bituminous and hot mix asphalt is now available from Cleaver-Brooks Company, and its subsidiary, Cleaver-Brooks Special Products.

The unit is equipped with a choice of 10-, 15-, or 20-thousand gallon asphalt storage tank and a Cleaver-Brooks Peak-Temp oil heater, designed to quickly and efficiently boost the temperature to 450 deg. F. eliminating freeze-ups.

Built-in safety protection is made possible by utilizing electric, electronic, and pressure safety controls safely shutting down the heater in the event of flame failure, high pressure and temperature, low liquid, and loss of oil. **(351)**

● Multiwall sacks for cement that stretch to absorb shocks that would split conventional sacks are offered by Clupak, Incorporated.

In the warehousing operation illustrated, the bottom sacks carry 6,000 lb. of weight without failing. The resilience of the Clupak bags makes them easier to fill and store than bags and sacks of the same basis weight made of ordinary paper. The resilience also makes them conform better to one another, providing greater friction area between bags and affording less likelihood of load shifting. Warehousemen report that in some instances five Clupak sacks will fit in a space previously occupied by four ordinary multiwall sacks.

In a series of breakage tests conducted for a year, cement bags made of Clupak withstood up to six times the punishment of regular kraft multiwalls of heavier basis weight. The tests, repeated flat drops from a height of 4 ft. until the bags broke, were under standard laboratory conditions of 73 deg. F. and 50 percent humidity.

The top performance was that of 3-ply Clupak bags with a total paper basis weight of 150 lb. each (containing 94 lb. of cement), which

and equipment

for further information use card on page 145

averaged 18.2 drops to failure. Against this, 4-ply regular kraft bags with higher basis weights of 170 and 180 averaged 3 and 3.8 drops to failure, respectively. The total basis weight of the paper used in the Clupak bag is less than the regular kraft bags, which allows the stronger Clupak bags to be available at prices the same as, or lower than, regular kraft bags. (352)

● A new low-cost pre-mixed blasting agent for use in mining, quarrying, construction, and petroleum exploration, has been announced by officials of the Du Pont Company.

"Nilite" 101 nitro-carbo-nitrate blasting agent, which can be used in holes as small as two inches in diameter, is now available in 50-lb. bags for delivery throughout the country.

Du Pont reports the advantages of Nilite 101 are its assurance of uniformity in blasting, and its free flow. The company also states that the new agent improves performance of delay blasting systems, is not cap sensitive, and requires a primer to detonate it. (353)

● Two new 6-wheel diesel trucks, designed for heavy-duty service over rough terrain, and severe conditions, have been added to the B-61S line of Mack Trucks, Incorporated.

The B-613SE is powered by Mack's turbo-charged ENDT 673 diesel engine which develops 205 horsepower at 2,100 r.p.m. The B-61SE offers a naturally aspirated version of the same engine, developing 170 hp.

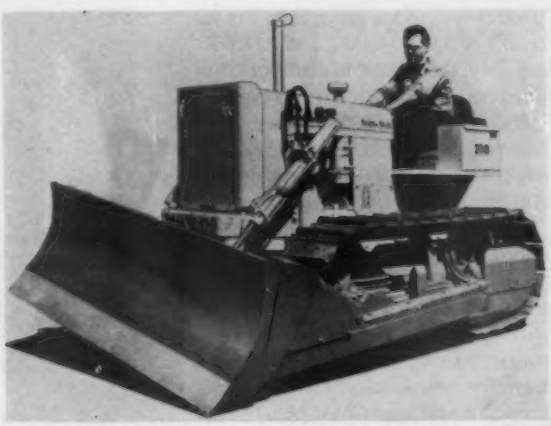
Other features of these trucks are: longer 55 in.-front spring, and rubber shock insulators, providing added driver comfort; a new 3-piece cast radiator affording increased cooling and longer life; a version of Mack's balanced bogie featuring cast steel housings and a 55-in. wheelbase, permitting 24-in. tires.

Inside and outside channel reinforcement is used to make up the 3-channel heat-treated chrome manganese steel frame offered on both trucks. (354)

● The J. I. Case Company is now producing new higher output Case Utility dozer units, with power-angling or power-tilt blades. Job proved for over three years on larger Case industrial crawler tractors, these hydraulic-powered blades are now offered mounted on 42 hp. Model 310 Utility crawlers.

Case 310 Utility power-angling dozer allows operator to angle the blade 25 deg. left or right without having to stop the tractor and put the blade into correct position by hand or other means. The power to angle the blade is supplied by two double-acting hydraulic cylinders mounted on the A-frame behind the moldboard for protection from brush and rocks. Dash-mounted hydraulic lever controls angle of blade.

Model 310 hydraulic tilt-dozer is designed for road crowning, ditching, digging out trees, breaking up hardpan and maintaining level grades in rough terrain. Power-tilt blade tilts to either side while the tractor is in motion. To tilt left corner of blade up to 11 in. below grade, operator pushes a hydraulic lever located on the dash. Pulling the same lever levels it or tilts the right corner down. Power is provided by a large hydraulic cylinder mounted on left push arm, and attached to upper rear corner of blade. (355)



● Model 817 "Add-A-Bin" cold aggregate feeder, particularly suitable for high capacity continous or batch mixing asphalt plants, has been announced by Barber-Greene Company.

Each bin is a complete unit constructed to permit combinations of two, three, four or more units. Each has a basic capacity of eight tons and through the addition of bin extensions, in two, four, and six foot increments, this capacity can be increased, at the rate of four-tons-per-foot of extension, until each bin has a capacity of 32 tons.

Each bin is equipped with a Barber-Greene Model 432 belt feeder and when used in any combination of any number of bins, the manufacturer reports total and proportional control of the aggregate feed can be achieved. Individual gear-motor drives on each feeder or a single gasoline engine, driving each feeder through interlocked lineshaft drives makes this feature possible.

As many as three 817 bins can be combined on a single axle portable chassis. **(356)**

● Three new engineering features are now available on an expanded number of the lift trucks made by Hyster Company. The introduction was made at the Material Handling Institute's New England Show in June.

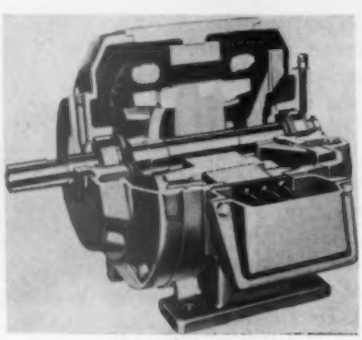
The improvements are Monotrol control system for pneumatic-tire lift trucks of 3,000, 4,000, and 5,000 lb. capacity; three stage upright for cushion and pneumatic-tire trucks of 6,000, 7,000, and 8,000 lb. capacity; heavy-duty oil clutch for pneumatic-tire lift trucks of 6,000 through 12,000 lb. capacity.

The Monotrol system was introduced last year on Hyster cushion-tire lift trucks of 3,000 to 5,000 lb. capacity. Working in combination with the power-shift Hystamatic transmission, Monotrol combines forward-reverse selection and throttle in a single, right-foot pedal. This eliminates transmission control levers, and allows the operator full-time use of his hands. **(357)**

● Open, weatherproof a.-c. motors with an epoxy-encapsulated insulation system have been introduced by Reliance Electric and Engineering Company.

The new Duty Master weatherproof motors are currently available in frames 180 through 445U (1 hp. through 125 hp.) in all standard speeds and voltages.

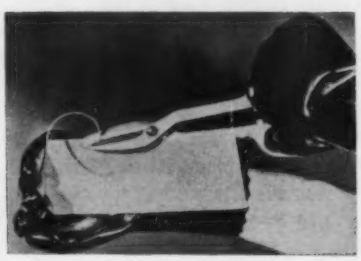
A "metermatic" lubrication system is employed with the deep-groove, double-shielded ball bearings, and a special rust-preventing coating is applied to all internal metal surfaces such as the rotor, stator, and air deflectors. **(358)**



● A car shaker that is reportedly completely safe for one-man operation is being produced by Syntron Company.

It is mounted anywhere along the length of the car by means of a jib crane or fork lift. There is no need for the operator to get in, on, or under the car, and no chains or rods to tighten.

The vibrator is mounted in a sturdy steel frame designed to hook over light or heavy flanged car sides. A balancing counterweight simplifies mounting, and contributes to the vibrating action. The unit produces 900 vibrations per min., operating from 220 or 440 v., 3-phase, 60 cycle a.-c. supply. **(359)**



● Longer glove life and positive hand and materials protection are the claims made for the new "Multi-Pli" Stanzoil Pacemaker work gloves being introduced by the Pioneer Rubber Company.

These gloves withstand abrasive wear and resist corrosive deterioration without loss of flexibility. **(360)**

Enter 61 on card, page 145 →

B.F.Goodrich helps change the face of a river

40 TONS OF CONCRETE ride to the bottom of Barkley Lock on B.F.Goodrich Rock Service tires. These gigantic tires (over 6 feet high) are built with B.F.Goodrich Flex-Rite Nylon cords that withstand double the impact of ordinary materials, resist heat blowouts and flex breaks. The new B.F.Goodrich Cut Protected tread compound guards against the kind of severe rock cuts and chipping found on such projects as Barkley Lock.

Hundreds of B.F.Goodrich tires—and other products—speed development of Cumberland River Basin

TWENTY-FOUR miles east of Paducah, Kentucky, they're changing the face of the Cumberland River. Here Barkley Dam will rise to a height of 155 feet, forming 62,000-acre Lake Barkley—key units in the development of the Cumberland River Basin.

This $182-million project (including construction of a lock, power plant and canal) will provide flood control, improve navigation and produce 600-million kilowatt-hours of energy a year. The completed lock will have a chamber 110′ x 800′ and a lift of 52′ to 57′. Five outmoded locks will be eliminated.

On the job: Tecon Corporation, general contractors of Dallas, Texas, who have chosen B.F.Goodrich tires, industrial products, protective clothing and footwear 100%. BFG Special Contractor's Representatives work hand-in-glove with Tecon on all phases of Barkley Construction.

This B.F.Goodrich report continues ▶

Wherever you look at Barkley Dam you'll see B.F.Goodrich tires on the job

HELPING Tecon Corporation meet the challenges of the $182-million Barkley Dam project are a corps of B.F.Goodrich on-the-scene specialists and scores of different B.F.Goodrich products.

Giant BFG Rock Service tires haul concrete and rock. Rock Logger tires deliver fly ash. B.F.Goodrich All-Purpose tires support a "cement hog." Traction Express and Power Express tires bring in supplies. Power Grader and Universal tires move earth.

This is only the beginning. You'll find B.F.Goodrich hose delivering air, water, even dry cement. BFG V-belts drive pumps, crushers and vibrator screens. Conveyor belts carry sand and aggregate. And the 700 Tecon men on the project wear B.F.Goodrich protective clothing and footwear.

To keep the whole job humming, B.F.Goodrich provides special maintenance and service facilities, all part of the new B.F.Goodrich Unified Contractor Program. If *you* want to cut the cost of doing business, it will pay you to talk to B.F.Goodrich. Your Smileage dealer is listed in the Yellow Pages. Or write *The B.F.Goodrich Company, Akron 18, Ohio.*

Specify B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

B.F.Goodrich Smileage!

AT BARKLEY LOCK, workman rough up concrete surface for new pour. BFG hose carries air and water under high pressure. Yellow rainsuits and footwear protect men. B.F.Goodrich Unified Contractor Program provides Tecon with everything from tires to boots to belts.

CONSTANT TIRE INSPECTION by B.F.Goodrich on-the-job service men avoids delays, lowers operating costs. Servicemobile is equipped with all the latest power tools. Complete stock in B.F.Goodrich Tire Service Building (built for this project) includes BFG batteries used in all Tecon motorized equipment.

SPECIALLY BUILT TANK TRUCK delivers 30 tons of fly ash. Tecon Corp. chose rugged B.F.Goodrich Rock Logger tires because the extra-thick tread defies rock cuts, gives positive traction in forward or reverse. 125 pieces of equipment work on Barkley Dam which will have an overall length of 10,020 feet.

◀ **24 HOURS A DAY, 6 DAYS A WEEK,** trucks haul tons of rock out of Barkley Dam excavation. Haul roads are steep and strewn with abrasive rock. Yet B.F.Goodrich Rock Service tires are so rugged that many actually can be retreaded up to 3 times on this operation. Note BFG Servicemobile, at work as usual.

B. F. GOODRICH CONVEYOR BELTS AND HOSE arrive at Barkley Dam on tractor-trailer equipped with Power Express and Traction Express tires. (Users call the Traction Express the "100,000-mile tire.")

B. F. GOODRICH ALL-PURPOSE TIRES (as at home in the rough as on the highway) give mobility to "cement hog" that carries dry cement to batch plant. BFG contractor's program helps Tecon simplify purchasing, eliminate confusion, cut equipment and operating costs.

OFF-THE-ROAD TIRES BY B.F.Goodrich

● Some of the major features of the Eimco Corporation 103 line of 100-hp. diesel engine crawler-tractors now in production are stress-flow construction, 17-in. ground clearance, hydraulic track take-up arrangement, and up-front operator position.

Combined with the ground clearance of 17 in. is track oscillation of 14 in., and, because of independently reversible tracks, the ability to make spin turns.

The air-cooled, mechanical, disc-type brakes, independently operated for each crawler track, are actuated by foot pedals in the tractor cab. Both brakes are contained in cavities in the main frame, and are sealed to keep out dirt and other debris.

By means of a hydraulic cylinder within the track assembly, pressure can be increased or relieved on the front idler, thus causing a corresponding force or relief on the entire track assembly. To tighten the tracks, chassis grease is pumped into a fitting on the track assembly. This pressure on the hydraulic cylinder in turn increases the pressure on the front idler, tightening the tracks. The tracks can be loosened by removing a relief-hole cap screw. The weight of the tracks forces the hydraulic cylinder to retract, forcing excess grease out of the relief hole.

Dual suction-type radiator fans on the engine dissipate engine heat away from the tractor operator, and protect the radiator from being "sand-blasted" by dirt and grit. The fans are driven by the engine's rear power take-off. The engine is located in the center of the tractor, and is bolted to the single-piece, cast-steel main frame.

Stress-flow construction is illustrated in the smaller picture, showing the diagonal brace assemblies. Each diagonal brace is integrally cast with a track roller frame. The steel castings have been so designed that internal stresses, and stresses due to applied loads "flow" evenly throughout the structure.

The power team is a 4-speed countershaft transmission combined with a single-stage torque converter and dual drive. The transmission, furnished with the "Unidrive" unit used in the heavier 105 Series, features constant mesh gears that, reportedly, never reverse rotation.

The Model 123 front end loader, one of the four models in the 103 series, has maximum dump angle of 63 deg, at full height. The dump angle at half height is 49 deg. All controls on all models can be operated with the fingertip pressure of one hand. (361)

● A new air-controlled crane-excavator in the 3½ to 4½ cu. yd. size, the American 900 Series, has been announced by the American Hoist & Derrick Company.

When rigged as a lifting crane the unit has a rated capacity of 110 tons.

Several types of booms are available. The erecting type has an operating length of 270 ft., plus jib. The 3½-cu. yd. single-stick, rope-crowd shovel attachment gives good floor clean-up and reach.

Traction chains and side frames are mounted for easy maintenance and minimum wear.

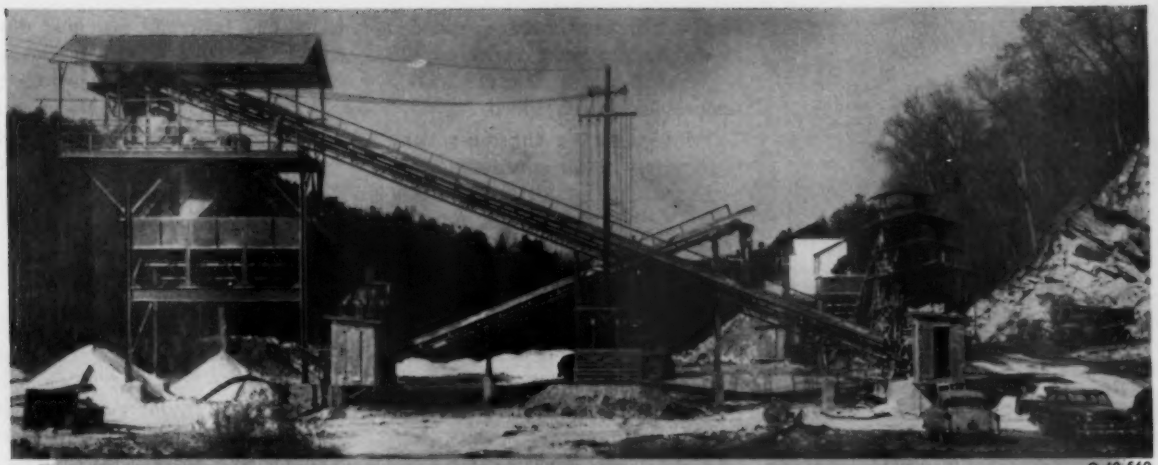
Brakes and clutches are oversize. All constantly turning shafts and drums rotate on anti-friction bearings.

Where required, gears, shafts, and jaw clutches are sealed and run in an oil bath.

Independent swing is available with either air-controlled friction clutches or hydrostatic drive. The boom hoist features a sprag-type overrunning, lowering clutch.

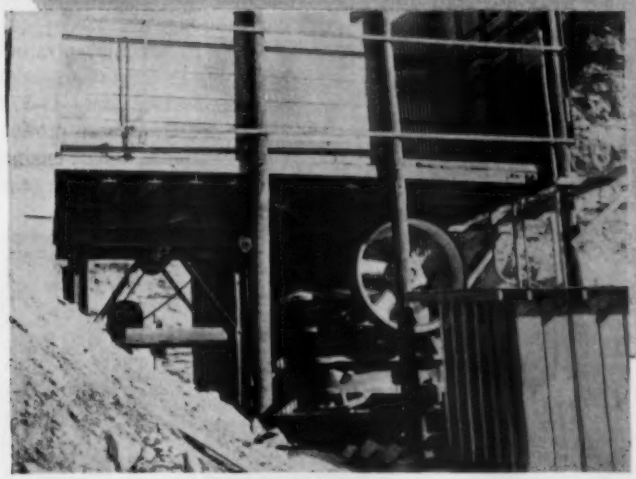
According to the manufacturer, in its size range the American 900 Series is the easiest and quickest to prepare for transport.

The unit can be furnished with General Motors, Cummins, Caterpillar, or Allis-Chalmers diesel engines, with various torque converters or with direct drive. (362)



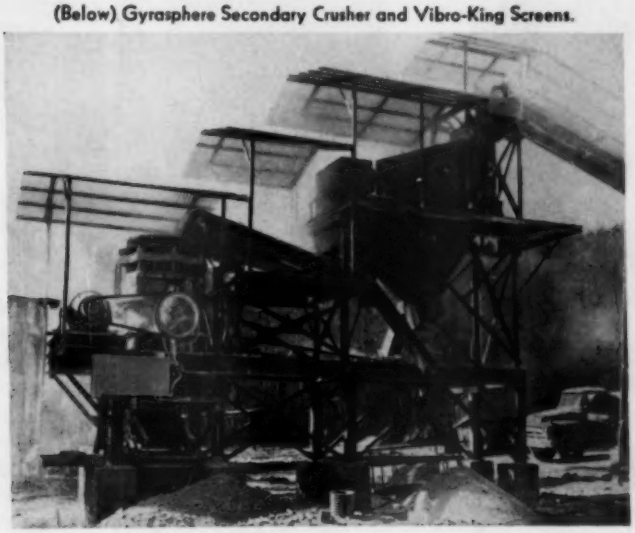
Q-40-560

Georgia Marble Co. crushing plant



(Above) Telsmith Jaw Crusher and Apron Feeder.

(Below) Gyrasphere Secondary Crusher and Vibro-King Screens.



TELSMITH *designed*

to produce road rock and roofing chips

Making 125 tons per hour of 1½" plus ¼", and minus ¼" aggregate for road rock . . . or crushing everything down to minus ⅜" plus ¼", minus ¼" plus ⅛", and minus ⅛" when producing roofing chips, at 75 tons per hour. That's what Georgia Marble Company's Whiteside, Ga. crushing-screening plant was Telsmith-designed to do. Does it smoothly and steadily day-in-day-out. Tailor-made for today's conditions and competition, Telsmith plants pay off in capacity, product flexibility and operating economy. Send for descriptive bulletins.

TELSMITH Equipment in this plant—

36" x 8' Heavy Duty Apron Feeder • 25 x 36 Roller Bearing Jaw Crusher • 4' x 10' double deck Vibro-King Screen • 36-S Gyrasphere Secondary Crusher • 5' x 16' triple deck Vibro-King Screen • Three 15" x 15" Duplex Bin Gates • Five Telsmith-Barber-Greene Conveyors: 18", 24", 36", total length, 312'.

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

Representatives in Principal Cities in All Parts of the World • Cable Address: Sengworks, Milwaukee

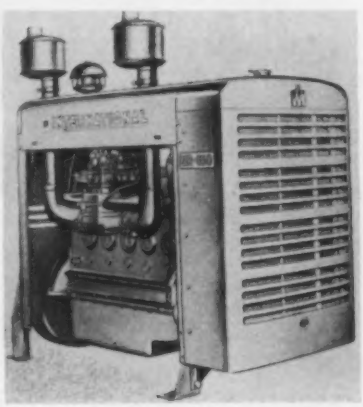
● The line of 3-phase, squirrel-cage induction motors made by Lincoln Electric Company has been expanded to include sizes from ½ hp. to 125 hp., and several trouble eliminating features have been added.

"Multiguard," a thermo-setting plastic, is used to encapsulate and impregnate the stator on all motor sizes. The cast-aluminum rotor is supported by Super Conrad type bearings. The motor can be operated in either horizontal or vertical position. Positive housing seal is achieved by mounting a neoprene slinger on the shaft against the exterior end bell, and fastening dust caps to the inner face. The housing has a reservoir for grease storage. The motor, including steel frame, end bells, and rotor, is coated inside and out with a vinyl-based primer and acid-resistant paint. **(363)**

● Three new units, the UR-372, UR-450, and UR-501 engines, have been added to the International line of 6-cylinder carbureted engines manufactured by the Construction Equipment Division of International Harvester Company.

These new engines feature downdraft carburetion with velocity governor, and higher horsepower ratings than the current International models of the same displacement—U-372, U-450, and U-501—whose production will be continued. These engines have updraft carburetion with a gear-driven mechanical governor.

Maximum horsepower ratings are



165 at 3,200 r.p.m. for the UR-372; 182 at 3,000 r.p.m. for the UR-450; and 212 at 3,000 r.p.m. for the UR-501.

All six models are available with natural gas and LPG attachments.

Among the features are full-flow oil filter, improved distributor drive, high-capacity coil, and even-operating temperatures.

The manufacturer suggests that the UR units are applicable to all types of pumping operations, and to blowers, while the other three models, available with distributor or horizontal magneto ignition, are suited for use with shovels, cranes, and generators. **(364)**

Every day, throughout the world, Schrock Motorized Pulleys move a mountain of "profit-tons"... rolling dependably and economically under all weather and job conditions. Simple, money-saving installation on your present conveyors, outstanding performance, down-time is virtually eliminated. Upkeep consists only of maintaining the proper oil level.

YOU GET POWER, PULLEY **AND** PROFITS IN **ONE** PACKAGE WITH SCHROCK MOTORIZED PULLEYS ... ENGINEERED BY WESCON TO GIVE TOP OPERATING EFFICIENCY AND INCREASED PRODUCTION AT LOWER COST.

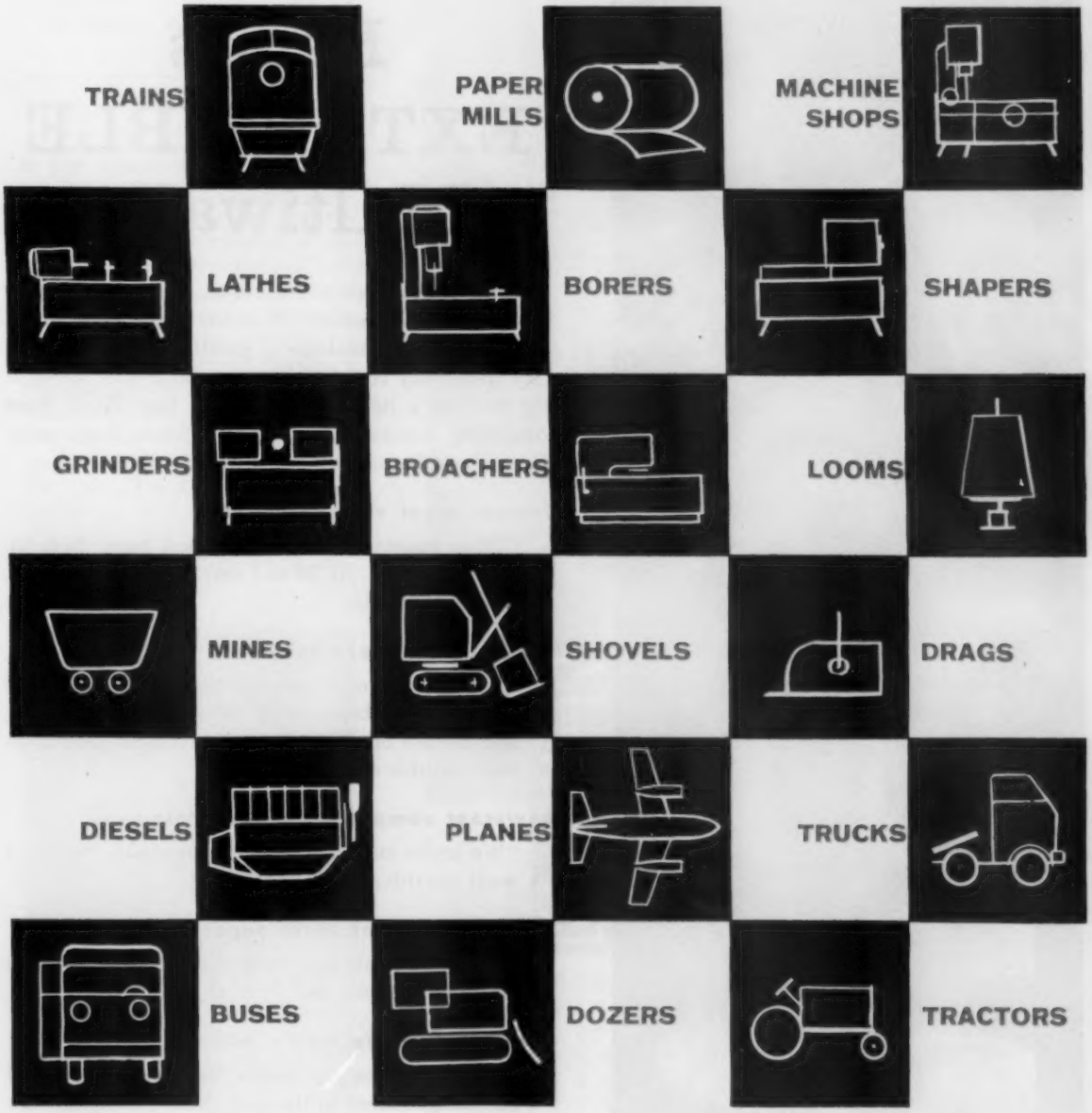
Manufactured by:
WESTERN CONVEYOR CO.
P. O. Box 357 BOISE, IDAHO TWX BE 197

Schrock Motorized Pulleys are manufactured in varying sizes and motor ratings from 1 to 125 hp. For price lists and specifications, write for name of nearest distributor.

"—the best conveyor drives on the market today." — Rinker Rock Co. Bakersfield, Calif.

Enter 66 on card, page 145

If you manage or operate any of these...



...your best move is to Sinclair's specialized greases, oils and lubricants, to cut costs, speed operations and increase profits. There are more than 500 of these money-savers, and each does its particular job particularly well. For helpful information based on actual experience, call your Sinclair Representative or write

Sinclair

SINCLAIR REFINING COMPANY
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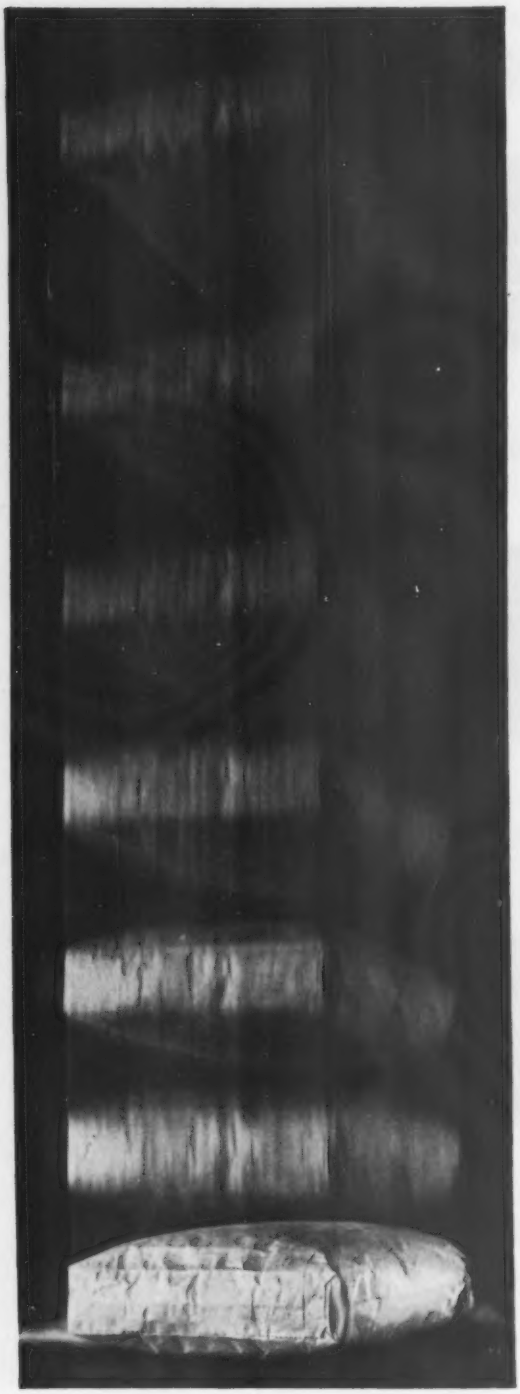

You're really hitting the jackpot when you get *better* multiwalls for *less money* . . .

Bemis EXTENSIBLE Multiwalls

They are better than conventional multiwalls because they are shock-resistant. More than two years of use has proved that breakage is greatly minimized. And they frequently cost less because the greater strength lets you use a lighter basis weight bag. Read these convincing quotes from men who know from experience about Bemis Extensible Multiwalls . . .

Cement plant superintendent:

"These extensible bags are the best paper bags we have ever used. As far as I am concerned, we won't use anything else."

Cement packhouse foreman:

"I caught my men amusing themselves by letting these 'rubber' bags run off the end of the conveyor and bounce on the cement floor. Our regular bags burst on this drop."

Assistant cement packhouse foreman:

"We broke only two bags in two weeks. We don't want anything else."

Assistant cement plant superintendent:

"Your extensible bags have eliminated our serious customer complaints."

Cement company traffic manager:

"I didn't believe you before, because I have heard exorbitant claims in the past. Now I am sold—we haven't had a serious complaint since we switched to your 'stretch' bag."

Bemis pioneered extensible multiwalls, so we have had longer experience with them than any other bag maker. You can profit by that experience. Get in touch with your Bemis Man promptly.

Bemis *Where flexible packaging ideas are born*

GENERAL OFFICES — 408-Y PINE ST., ST. LOUIS 2

Marion Long-Life Hopper Trailers

FOR FAST, LOW-COST HANDLING OF COAL, AGGREGATE, ORE

Look at the performance-proven facts!

• SAVES TIME when dumping—you get more round trips which means more payloads. • MINIMUM MAINTENANCE—there's little to get out of order. • RUGGEDLY BUILT to withstand severe usage. • SINGLE AND TANDEM AXLE units for highway use according to state road law. FOR OFF-HIGHWAY use in coal, aggregates, ore. • CAPACITIES—10 to 100 cubic yards. • CENTER PARTITION available to provide two compartments for better load distribution and extra side support. • DOUBLE OR SINGLE sets of doors lengthwise or cross doors for dumping and spreading. • IDEAL FOR CONTROLLED SPREADING of aggregate on road jobs with power operated or manual door opening. • EACH HOPPER is job engineered to fit your operation and the material to be hauled. Your nearby Marion Distributor will be glad to give you full details on Marion Hoppers best suited to your operation. Marion makes a complete line of hydraulic hoists and dump bodies.

MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.

Enter 69 on card, page 145

Check
MORE INFORMATION, PLEASE
pages 145—146
for solutions to your problems.

● The Gardner-Denver Zephyr, a new rotary drilling rig, designed for one-man operation, is now manufactured by Gardner-Denver Company. The rig is self-contained, having its own power, hydraulic, and compressed air systems. It is self-propelled with engine power to the drive wheels (or track) through a transmission which gives four forward speeds and one reverse. This transmission provides four rotary speed options varying from 20 to 450 r.p.m. The Zephyr is designed for drilling hole size diameters of 1¾ in. to 3¼ in. Various kelly sizes are available from 1¼ in. hexagon to 3 in. round. **(365)**

More proof that...

AMSCO HELPS YOU HANDLE MORE TONS PER DOLLAR

AMSCO PUMP OPERATES 24 HOURS A DAY...PUMPS DISCHARGE 3 MILES

AT NEW ENGLAND DREDGE & DOCK COMPANY

On the dredge C. H. Cobb, operated by New England Dredge & Dock Co., the Amsco 12″ Form 50 S3B pump shown at right is "on duty" 24 hours a day, 6 days a week. It handles 5000 yards a day, pumps discharge over 3 miles with one booster... under 23 railroad tracks, through a mile-long railroad tunnel and through cliffs to a marshland.

Regarding this Amsco pump, installed 2½ years ago, Mr. C. H. Cobb, General Superintendent says—"Its performance and price make this the most desirable pump on the market".

JAW PLATES REDESIGNED IN AMSCO ALLOY...TONNAGE UPPED 75%

AT STAR ROCK PRODUCTS COMPANY

At Star Rock Products Co., Anaheim, California, crusher jaw plates previously used were giving only about 6 months' service. Large rocks dropped into the crusher often caused the jaw plates to "give" enough so the rocks wouldn't crush. Jams and costly delays resulted. Plates would often flow and crack.

Amsco collaborated on a redesign, using 2% chrome (Amsco MY) alloy. After 6 months' service, the plates were in excellent condition. Jams and delays have been eliminated, and tonnage handled *increased 75%*.

AMSCO

AMERICAN Brake Shoe COMPANY

American Manganese Steel Division • Chicago Heights, Ill.

Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
In Canada: Joliette Steel and Manitoba Steel Foundry Divisions

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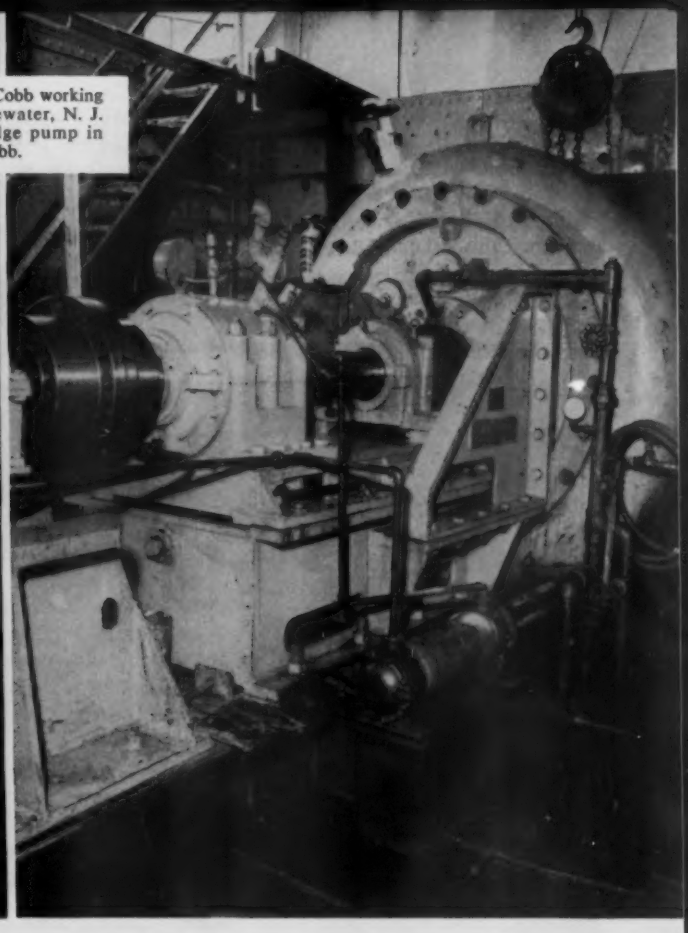


Left: View of dredge C. H. Cobb working around dock area in Edgewater, N. J. *Right:* Amsco 50 S3B dredge pump in pump room on the C. H. Cobb.

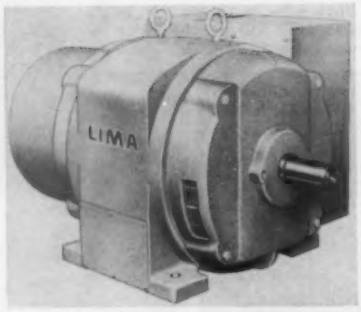
Left: General view of Star Rock Products plant at Anaheim, California. *Right:* View of Straub 20 x 36 crusher at Star Rock Products. Rocks up to 18" may pass through grizzly and outer crusher.

● A new line of "Precise Power" and "Special Brushless" a.c. generators and motor generators has been announced by The Lima Electric Motor Co. Incorporated, a subsidiary of Consolidated Diesel Electric Corporation.

The "Precise Power" a.c. generators and motor generators are available in ratings from 5 kw. through 100 kw., in open type construction, with static exciter-regulators. Inherent regulation is to ± 10 percent, or magnetic amplifier regulation to ± 1 percent.

The "Special Brushless" a.c. generators, with dripproof construction, are adaptable for engine mount or for direct coupling to the driving motor. Lima synchronous generators, rated from 5 kw. at 1,800 r.p.m. through 100 kw. at 1,800 r.p.m. are equipped with "induction-exciter-regulators"—inherent regulation with no external controls.

The totally enclosed fan-cooled types are rated at 5 kw. at 1,800 r.p.m. through 50 kw. at 1,800 r.p.m. The "Special Brushless" generators are built to handle very high, intermittent, low power factor loads with minimum voltage dip. Example: A 50-hp. induction motor can be started on a 50 kw. generator with a standard magnetic across-the-line starter.



Custom designing of the a.c. generators and generator motors is available to meet the needs of special applications. (366)

● Hobart Autoflux H-950 is an inert automatic welding flux developed for use with automatic, submerged-arc, hardsurfacing wires. As it is truly inert, it will not cause complicated alloying effects with the deposited weld metal. When this flux is used, the hardness, ductility, and work-hardening characteristics will be determined only by the alloying content of the wires. Autoflux H-90 is available in 80-lb. bags, or, at extra cost, in fiber, plastic-lined drums. (367)

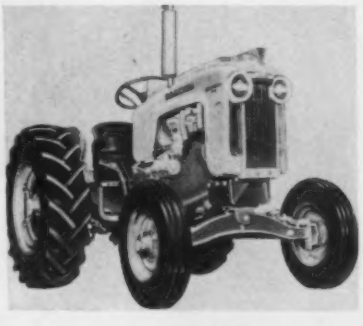
● A new series of wheeled industrial tractors for general purpose work has been announced by Minneapolis-Moline Company.

Named the Big Mo, the units are powered by a 207 cu. in. Moline engine. The big Mo. 500 develops 56 b.h.p. on gasoline and 50 b.h.p. on diesel fuel, at 1,750 r.p.m. The Big Mo 600 develops 60 b.h.p. on gasoline at 2,000 r.p.m. Both tractors have heavy-duty axles and frames capable of handling such attachments as dozer blades, crane hooks, backhoes, and several types of buckets.

There is a range of five speeds forward, from 2.63 to 14.57 m.p.h., and five reverse speeds, from 3.29 to 18.22 m.p.h. The shuttle gear does not interfere with regular forward speeds for drawbar work, but gives greater speed and flexibility when used in loading.

The 600 has a hydraulic reverse shuttle gear, and the 500 has a mechanical reverse shuttle.

Hydraulic power steering is standard on both models. (368)



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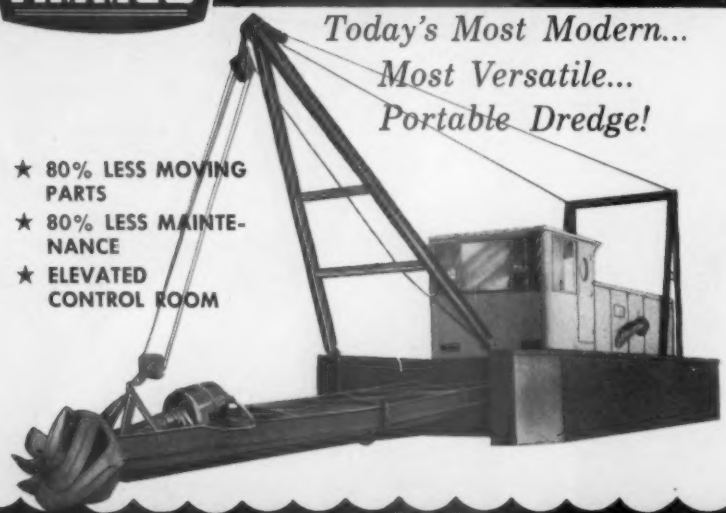

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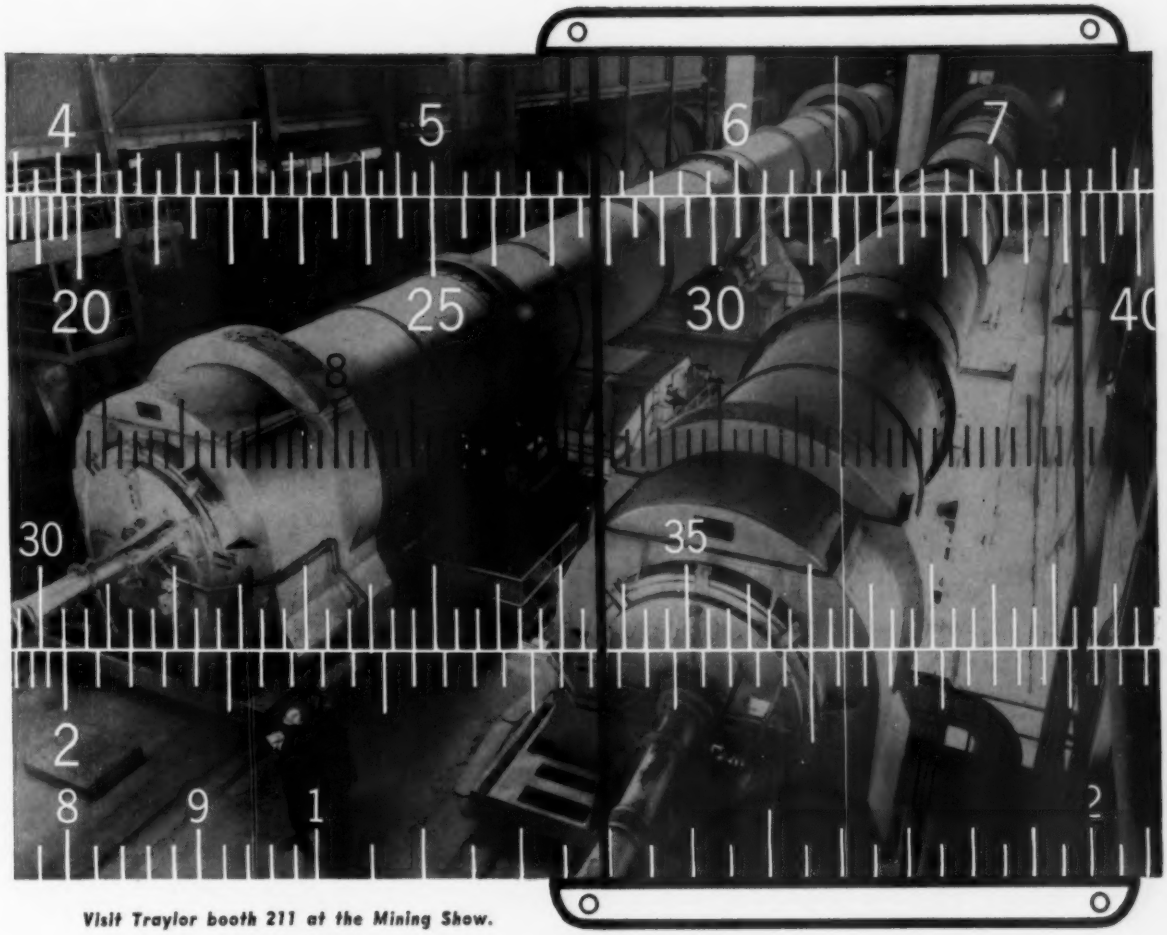

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*Shown in the background are two additional Traylor Kilns, 11′-3″ x 270′.

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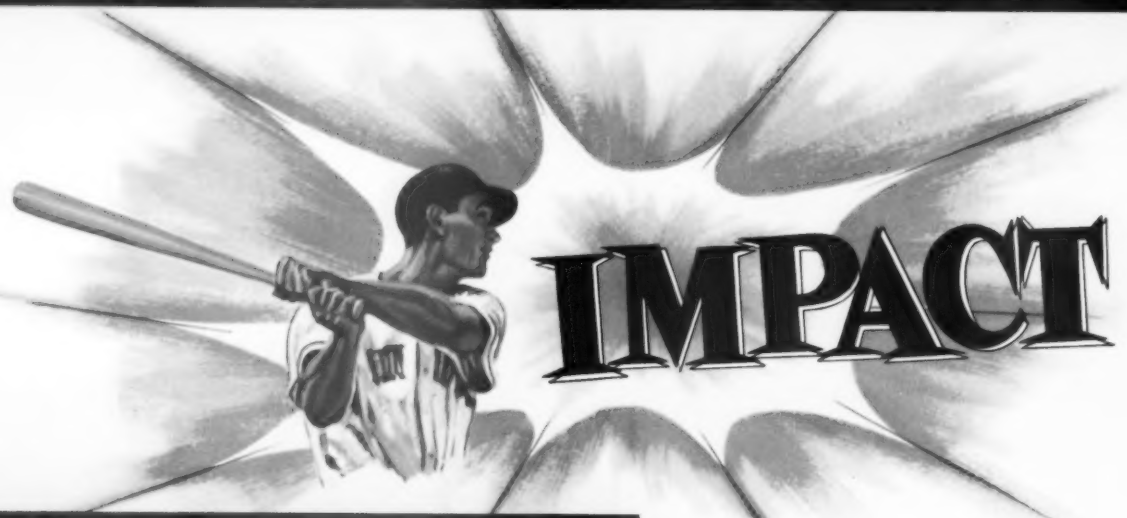

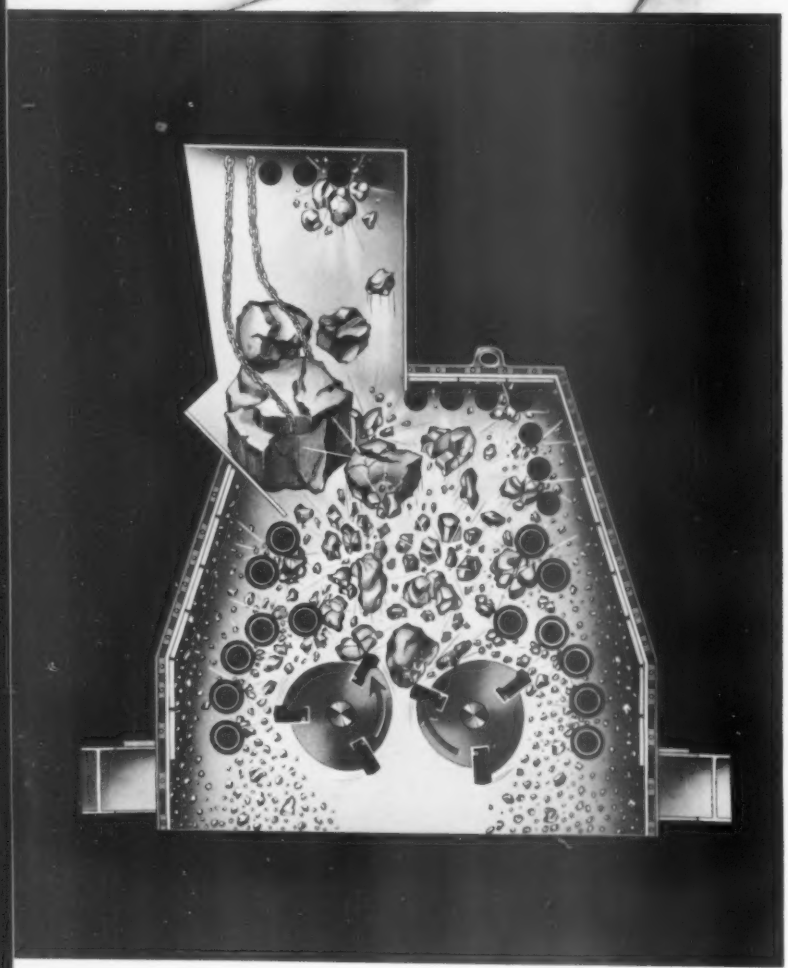

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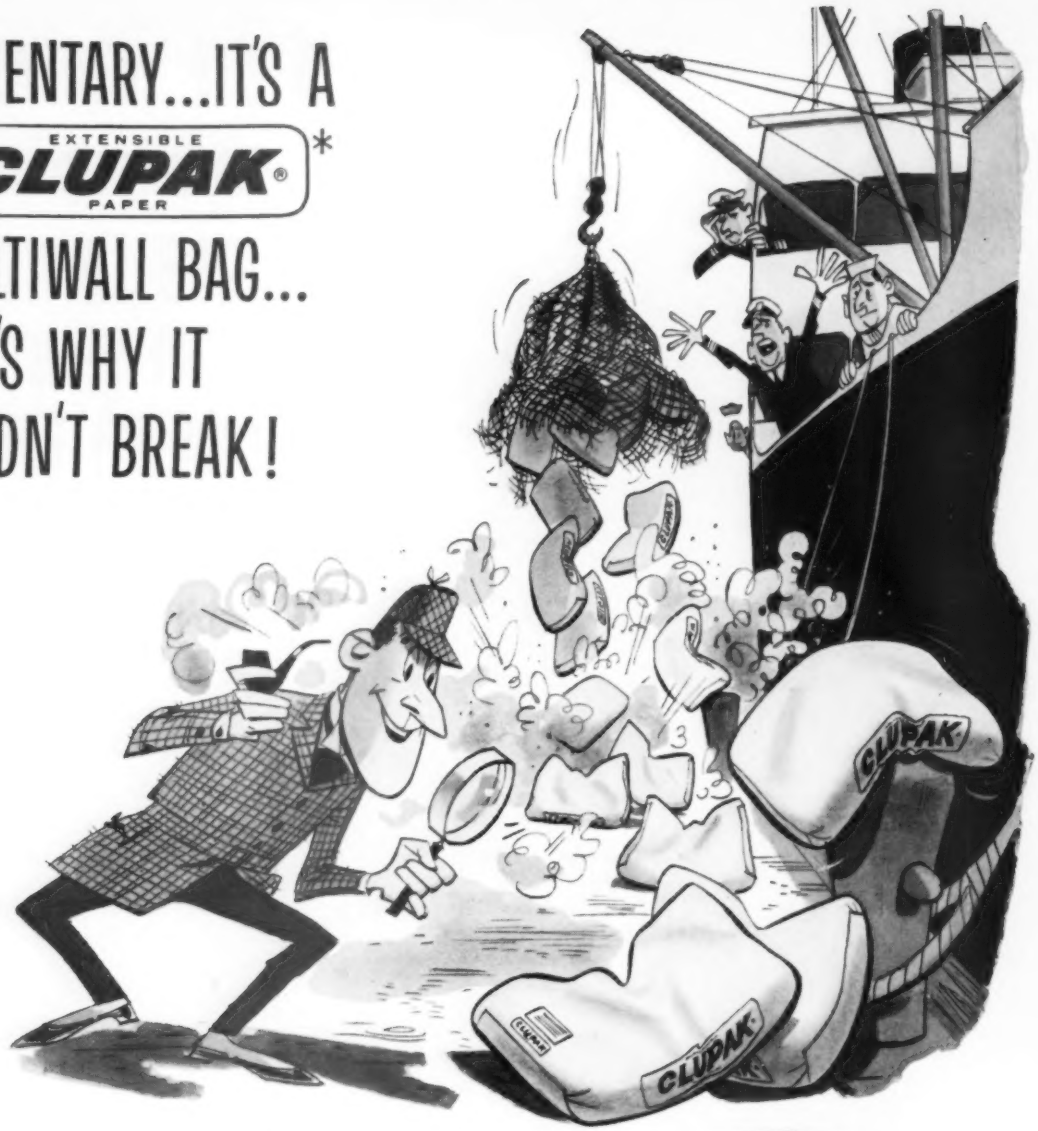

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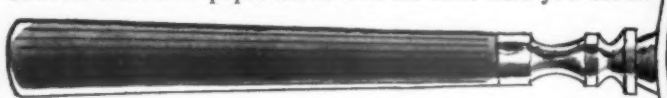

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Washington News Letter

(*Concluded from page* 11)

However, the first action has been taken through the easing of credit as a result of the reduction in the Federal Reserve Bank discount rates. The next action is already under way, not because the Administration wants it that way but because there is no real alternative. It is the substantial increase in government expenditures, resulting principally from the collapse of the Summit Conference. This is likely to unbalance the next budget even more seriously. While this is an inflationary action it also has the potential for re-employing the relatively large number of manufacturing employees who are either out of work or working less than full time at the moment.

The pressure for substantial increases in the expenditures of the Defense Department are practically irresistible. Senator Jackson of Washington has suggested increasing the budget by 2 billion dollars. Senator Symington of Missouri raised it to 3 billion dollars. Governor Rockefeller of New York agreed with this higher figure. Regardless of what the figure finally turns out to be, the atmosphere is such that it is sure to be higher than was orginally planned when the budget was first submitted.

The recent passage of the 7½ percent increase to Federal employees has also added unanticipated additional expenditure of about a billion dollars. Furthermore, should the aid to education bill pass, this too will add about a billion dollars.

There are a variety of other spending bills kicking around which, however, have very little chance of passage unless one or the other parties, or both of them, become desperate about their chances in November. On the other hand, the current estimates are that tax receipts in the near future will not be quite as high as anticipated because of recent pressures on the profit margins of corporations. This is, of course, the basis for the expected unbalanced budget.

FROM THE STANDPOINT of business, however, there may be a temporary upsurge toward the end of the summer. This will result not only from the government programs but also from the recovery in steel and other metal production that is expected to accompany the introduction of the new automobile models. In addition, there has been a substantial decline in inventories and, barring a recession which seems quite unlikely, there will be need to rebuild them.

There has been much talk in recent years that the substantial improvements in the mass communication media of radio and television make it no longer necessary, and in fact, quite wasteful, to have the long Presidential campaigns which were characteristic of earlier periods. This is really happening in the sense that the active campaigning period is being cut shorter and will, certainly, be cut short this year because of the necessity for most of the principals to be in Washington engaged in cleaning up the legislative requirements which were left unfinished. This, however, does not mean that the campaign is not under way. It is merely being waged in Congress rather than at the whistle stops.

Labor Developments

(*Concluded from page* 13)

which the parties had agreed would be determined by arbitration.

"The judiciary sits in these cases to bring into operation an arbitral process which substitutes a regime of peaceful settlement for the older regime of industrial conflict. Whether contracting out in the present case violated the agreement is the question. It is a question for the arbitor, not for the courts."

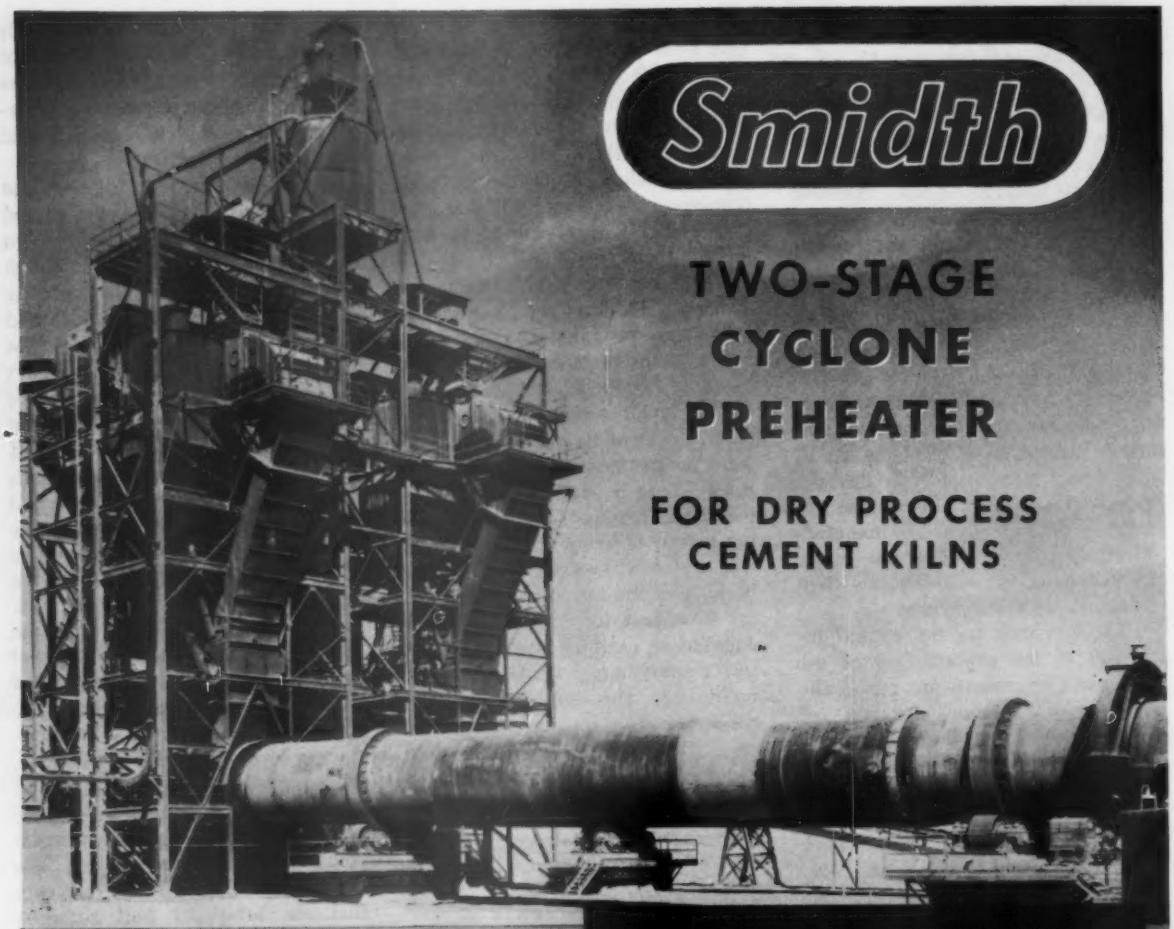
WHAT THE Supreme Court, by this decision, essentially said to employers and unions is that where there is a "no strike—no lockout" agreement accompanied by a standard type of arbitration clause, virtually all matters in dispute are subject to the grievance and arbitration procedure. The only way to prevent this result is to write *specifically* into the contract those matters which are not to be regarded as arbitrable. They have told the courts, specifically, to stay out of making any judgment as to the merits of the case. Throughout the decision there is the theme that the courts are not nearly as competent as the labor arbitrator —specifically selected by the parties because of his experience in labor-management relations—to arrive at an appropriate result.

The other two cases followed the same theme. One of them occurred because the company refused to go to arbitration on a grievance which it regarded as frivolous and patently baseless. The court agreed and found that the grievance was not arbitrable. The Supreme Court says that it was none of the lower court's business to determine anything about the merits of that grievance. If it was one which otherwise falls within the arbitrator's domain, it had to be arbitrated. If it was truly frivolous, it was, in the Supreme Court's view, the function of the arbitrator, not the court, to so find.

In the final case decided by the Supreme Court in its recent rash of cases on this question, it overruled the lower court which refused to require the enforcement of the arbitrator's award *in toto*. In this case, the arbitrator awarded back pay for a period which extended beyond the end of the labor agreement under which the arbitration occurred. The lower court found with the employer that the arbitrator had authority only to award back pay during the term of the agreement but not beyond it. It would, therefore, only enforce the award to that extent.

Here, again, the Supreme Court rebuked the lower court by reminding it that it was not empowered to examine the merits and interpret the labor agreement to determine the propriety of the award. The court could noly enforce the total award or none at all. However, to refuse enforcement is possible only on very narrow bases—principally where fraud is proved.

The net effect of these awards is to substantially increase the status of labor arbitration and the labor arbitrator. At the same time, it places even further emphasis on the necessity for careful drafting of the labor agreement. Certainly it can no longer be assumed that if something is omitted from the labor agreement it will give no trouble. Under the Supreme Court's decisions, omitted matters may very well be subject to arbitration.



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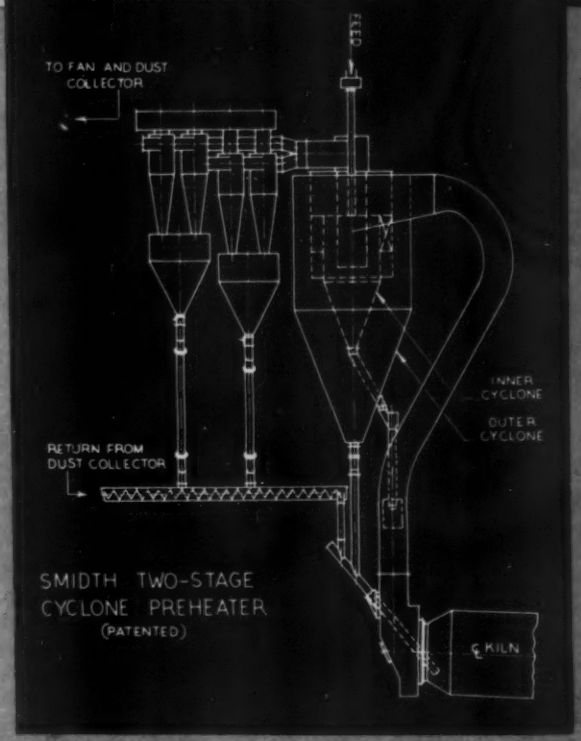

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The Editor's Page

Productivity — A Hollow Gain?

A REPORT recently released by the U. S. Bureau of Labor Statistics shows that productivity in private, non-farm industries increased more than 4 percent in 1959. This surpassed the annual average increase of about 2½ percent for the entire postwar period of 1947-59. Output per man-hour as used in this study refers to the constant dollar value of goods and services produced in relation to the hours of all private industry workers engaged in production. However, these figures alone are deceptive and can easily be misinterpreted.

Another recent government report stated that productivity is a crucial element in the wage-cost-price relationship. It represents the margin within which wage increases can be granted without increasing production costs or curtailing the amount available for other income payments. The figures reported show that, since 1947, workers' pay has increased more than twice as much, in percentage, as the increase in productivity. As each unit of output has to carry part of this excess wage cost, the labor cost per unit has been going up. Many believe that this is the main lever that is steadily forcing prices up in an endless inflationary spiral.

THE meaning of the above facts and figures is clear and unmistakable except to some labor leaders who, unchecked by any anti-trust legislation, can say almost anything without being held accountable. These leaders are trying to create the impression that productivity is up because employees are working harder than ever before. Their argument is that any increase in output per man-hour should be accompanied by an exact and proportionate increase in wages, so that, as growth proceeded and productivity increased, the union members would pocket 100 percent of the gain. They blithely ignore the rights of management, of stockholders who risk their savings in plant and equipment, and of consumers who justifiably expect lower prices as a result of improved efficiency or greater production.

Actually, it is industry itself that is producing more because of its heavy investment in mechanization and automation. The railroads provide an example: the union proudly proclaims that workers are handling more traffic today than ever before and their wages should be increased accordingly. Revenue traffic units handled by railroad employees during each hour worked have risen 49 percent since 1945, but this has been due primarily to the more productive plant created by over $14 billion of investors' money. Yet in that period straight-time earnings per hour worked increased 169 percent, or over three times as much as worker productivity.

IN THE cement industry a similar situation exists. The highly mechanized cement manufacturing process requires comparatively little manual labor, and man-hours per barrel of production are directly related to the capacity and efficiency of the machinery. Productivity, largely as a result of the millions of dollars which have been spent for capital improvements, has increased an average of 2.2 percent annually since 1945, but labor rates have increased an average of 7.7 percent annually.

Labor is entitled to share in the financial benefits resulting from improved technology—but wage gains should be kept in a realistic balance with productivity increases. Part of the savings must go to the investors if money is to be available for plant improvement and expansion. Part must also be passed on to the public in the form of lower prices.

Walter E. Trauffer

Catskill Producer Aims

Sullivan shoots for larger current, future markets with doubled capacity from new sand and gravel, crushed stone plants

By BUREN C. HEROD

A LITTLE more than a year ago the management of Sullivan Highway Products Company, Monticello, N. Y., faced an important decision affecting future operations and growth. The problem was not unique—many aggregates producers have faced a similar situation in recent years. But not all came up with a solution which, like that of Sullivan officials, displayed as much optimism toward economic growth.

Specifically, the Sullivan organization was confronted with diminishing reserves of readily available materials for its older sand and gravel plant at Summitville. The basic question was whether to move the older facilities to a new deposit near Masten Lake or to build a larger, completely modern plant at the latter location. Obvious production advantages to be gained with a new facility, plus an optimistic approach to long-range planning, back-dropped the decision to build an entirely new installation.

This planning also resulted in

A COMPLETELY NEW SAND AND GRAVEL OPERATION was built by the Sullivan firm at Masten Lake, in lieu of moving older facilities. At the left in this overall view, two belts from the primary are feeding the screens on the secondary plant. At the left center are the scrubber and sand processing units, and in the center background the final screen tower.

High—

significant changes in another direction. It was further decided to build a crushed stone operation at Bridgeville on a tract which the company had owned for some time. (A third aggregate plant, at Fosterdale, had adequate capacity in crushed stone, and was not involved in the overall expansion project.)

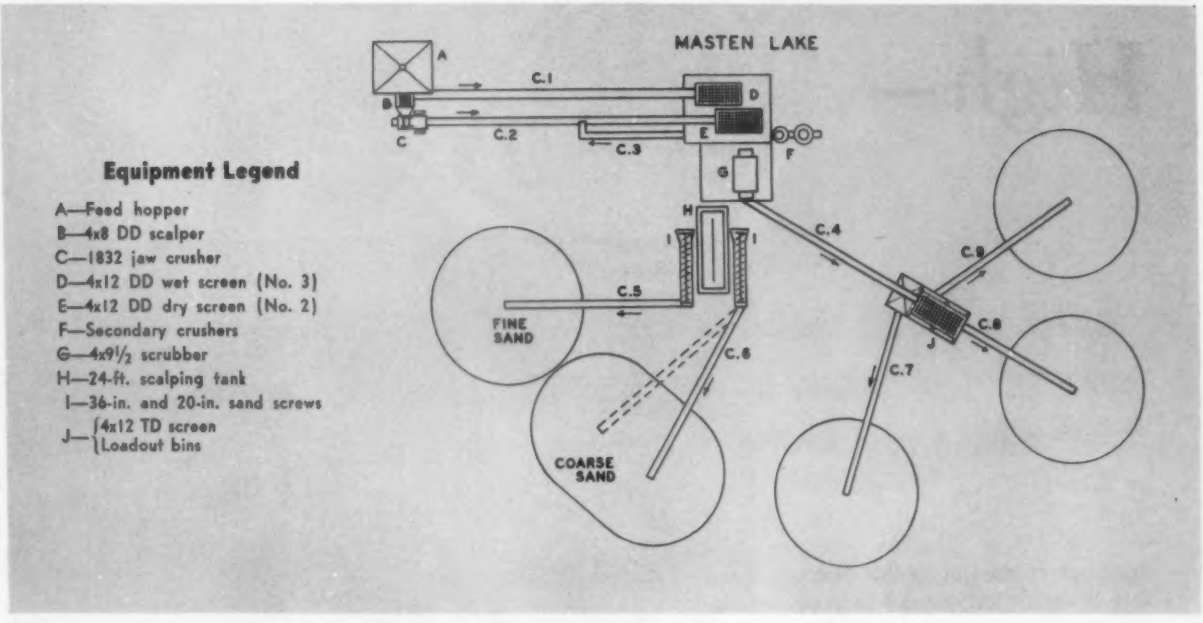
The two new installations were erected virtually simultaneously last year. Design and construction of the Masten Lake operation was handled by Hewitt-Robins, and H-R conveyors and screens are used throughout. The Bridgeville project —design and installation—was carried out by Aggregate Equipment Inc., Lancaster, Pa. Some of the components of the former Summitville operation were utilized in this plant, but several new items of equipment were installed, relating directly to the different type of material processed and to the higher design capacity.

With the three production facilities now in operation, Sullivan has a combined hourly capacity of nearly 600 t.p.h. of sand and gravel, and crushed stone—twice that formerly available. Each plant is rated at approximately 200 t.p.h., and the Masten Lake facility puts the company reportedly in the position of the leading sand and gravel producer in the county.

Part of the production from these three units is utilized in the firm's own bituminous mixing plants installed at Fosterdale, Liberty, and

THE DUMP HOPPER at Masten Lake is on approximately the same level as the pit, which is uphill from the main plant site.

AN OVERALL VIEW of the Bridgeville secondary crushed stone plant, showing the secondary crushing and screening tower, right center, and the final screening units above the load-out bins at the left. The primary crusher is located near the quarry.



Summitville (the site of the former sand and gravel operation). These materials are a part of approximately 60 percent of the total aggregate output consigned to municipal, county, and state agencies. The balance is sold to customers in the commercial market.

Masten Lake Efficiently laid out with compact arrangement of its individual processing phases, the Masten Lake plant and its stockpile area are centrally located with respect to the overall deposit. The latter varies in depth and size range, but consists on the average of 40 percent gravel and 60 percent sand.

Pit loading is done with a ¾-cu. yd. Northwest shovel; and three end-dump trucks are employed to haul to the plant feed hopper. In installing the latter, advantage was taken of the terrain, and the hopper was placed almost on a level with the pit operations, which are uphill from the plant site. The haul road from pit to hopper involves very little grade, and this is in favor of the load.

From the hopper, pit-run material is transferred *via* a 3- by 5-ft. H-R feeder to the scalper—a 4- by 8-ft. double-deck Vibrex. Separation is made on a 2⅝-in. hexagonal opening top deck, and a 1-in. opening bottom deck, and the oversize is chuted to an 18x32 Acme jaw crusher for primary reduction.

The latter has a 4-in. setting, and the discharge is received on plant feed belt No. 2 along with the plus 1-in. material from the bottom deck of the scalper. Throughs are chuted to conveyor No. 1, which like No. 2, is fitted with 24-in. wide belting.

Each of the above conveyors supplies a separate screen mounted above the secondary plant. These screens are identical 4- by 12-ft. double-deck Vibrex units. However, No. 2 screen, fed by No. 2 belt, is dry, while No. 3 screen, fed by No. 1 belt, is fitted with spray bars.

In addition to these screens, the compact secondary plant is equipped with several other processing units. These include the secondary crushers—36FC and 367S Telsmith Gyraspheres; a 4- by 9½-ft. Telsmith scrubber; plus two single-screw classifiers (20-in. by 25-ft. and 36- in. by 25-ft.) and a 24-ft. scalping tank supplied by Eagle Iron Works.

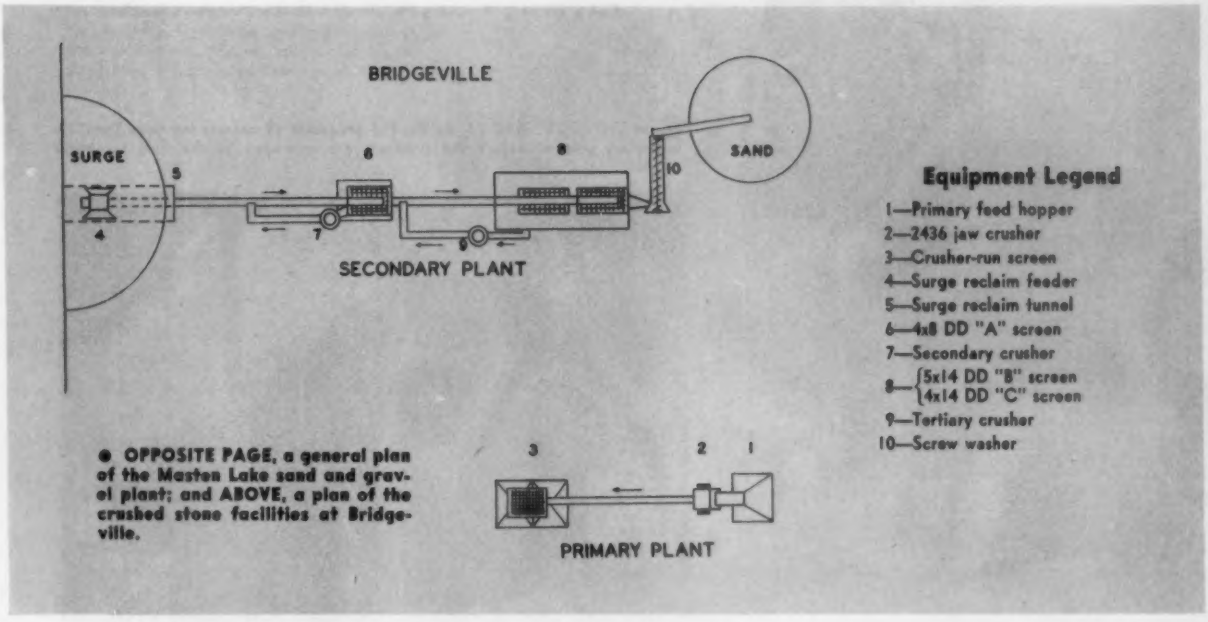
Screen No. 2 (dry) is equipped with two split decks, *i.e.*, 2-in. and 1-in. on the top, and 1-in. and $1\frac{1}{16}$-in. on the bottom. Retained material from the top is chuted to the 367S secondary crusher, and that from the bottom to the 36FC unit. Discharge from both crushers is received on 18-in. belt No. 3 for return to conveyor No. 2.

No. 3 screen is fitted with full ¾-in. opening screencloth on the top deck, and $\frac{3}{16}$-in. cloth on the bottom. Plus ¾-in. material may be chuted to a secondary crusher, or be flopgated with the $\frac{3}{16}$x¾ fraction from the bottom deck for delivery to the scrubber. The minus 3/16-in. throughs are flumed to the scalping tank.

The scrubber is fed the throughs from No. 2 screen and the bottom-deck fraction from No. 3. It has 14-in. openings in the outer barrel and ¾-in. in the inner. Scrubbed material is discharged to No. 4 conveyor for transfer to another screen, and the throughs are flumed to the scalping tank.

Products of the latter are delivered to the 36-in. coarse sand screw, and the 20-in. fine sand screw. The former discharges in turn to conveyor No. 6, a 24-in. by 100-ft. radial stacker supplying the concrete sand stockpile. An 18-in. by 86-ft. stationary stacker (No. 5) delivers the fine sand screw product to another stockpile.

Overflow from both the scalping tank and the screws is delivered by a K. C. Haypress Lightning pump to an Eesco cyclone for material re-



● **OPPOSITE PAGE, a general plan of the Masten Lake sand and gravel plant; and ABOVE, a plan of the crushed stone facilities at Bridgeville.**

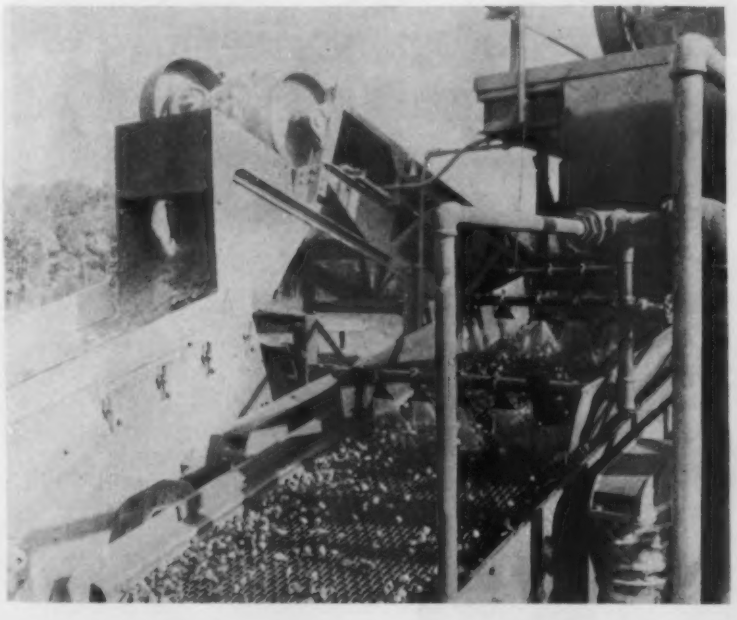
covery and reprocessing. Water for all these systems—wet screening, scrubbing, scalping, classifying—is provided at 100 g.p.m. from a deep well and 600 g.p.m. from a clear water pond, through a 6-in. header line.

Conveyor No. 4, which, as noted earlier, receives the scrubber product, feeds a 4- by 12-ft. triple-deck Vibrex finishing screen. The latter is mounted above a pair of 65-ton Heltzel steel loading bins. The final separation of 100 percent scrubbed product is made on $1\frac{1}{16}$- and $\frac{11}{16}$-in. openings of the upper and middle decks, respectively; and a split $\frac{1}{8}$- and $\frac{5}{16}$-in. bottom deck. The top two fractions are chuted into a compartment of blended material, and the remaining two into separate compartments of the bins.

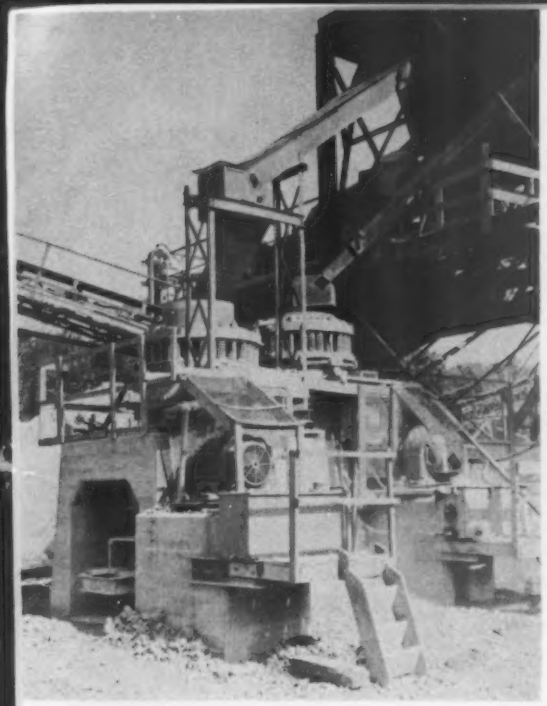
When the bins are full, products may be drawn through side gates onto fixed stackers No. 7, 8, and 9—all 86 ft. long and fitted with 18-in. belting. To augment direct loading of delivery units from the above bins, a pair of Michigan 175A loaders are employed in rehandling of stockpiled products. The latter are also used in spreading piles below stacker discharge points when necessary.

All shipments from Masten Lake are made by truck, and are weighed out over a 50-ton Howe truck scale. Operations are handled by a 12-man crew under Fred Stiene, superintendent. The plant proper requires the direct attention of only three men—one at the primary, another on the secondary screening and washing plant, and a third attending the various conveyors. In total, this crew represents approximately a 50 percent reduction in manpower from that required in the obsolescent, low-capacity plant formerly operated at Summitville.

(Turn page)

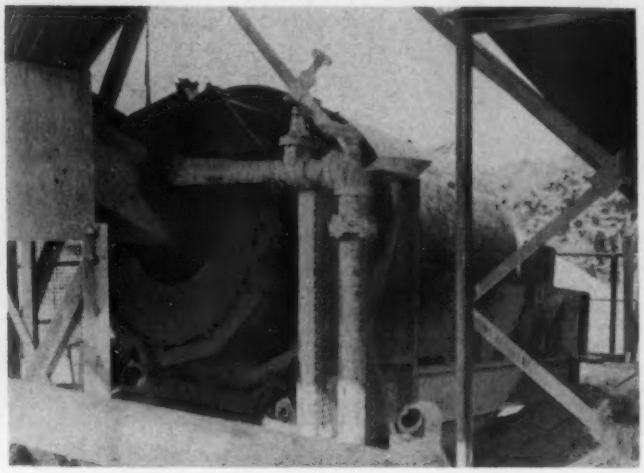


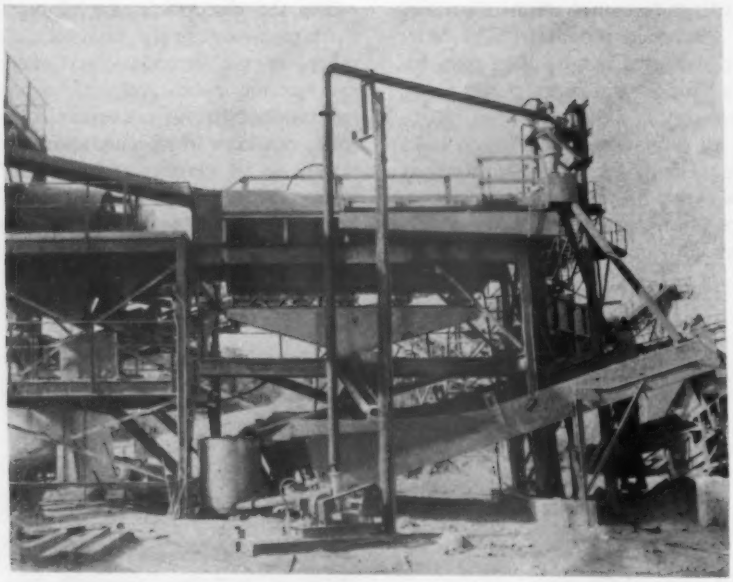
SECONDARY PLANT SCREENING is done both dry (left) and wet. The latter unit handles scalper throughs, and the former, crusher-run plus the scalper's bottom-deck fraction.



Left. **SECONDARY REDUCTION** is done with these two crushers. Discharge is received on a return belt closing the circuit with the dry screen feed conveyor.

Below: **THIS SCRUBBER** (4- by 9½-ft.) processes all coarser fractions from the secondary screens before the products are conveyed to the final screening phase.





Left: **THE SAND PROCESSING SECTION** of the secondary plant includes this scalping tank, two single-screw classifiers, and a small cyclone. The screws discharge to coarse and fine sand stackers.

Below, left: **SUPERVISORS.** Fred Stiene, left, superintendent, and his assistant, Jim O'Hagan.

Below: **FINISHED AGGREGATE** screening and stockpiling. Feed for the screen above the bins is delivered from the scrubber. When the bins are full, side gates pass the materials to the stationary stackers.

THE PRIMARY CRUSHING installation at the Bridgeville quarry incorporates a 2436 jaw crusher, right, and a scalping screen above the bins, left, on which plus 1⅛-in. plant feed is separated from crusher-run.

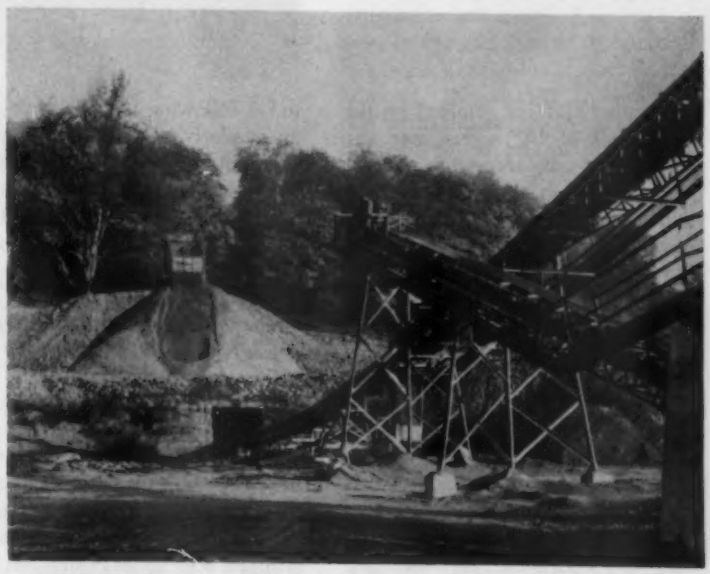
Bridgeville Also built around an efficiently simple flow design, the new 200-t.p.h. Bridgeville operation reflects a trend found in modern plant layout—the primary crushing stage is completely separate from the rest of the installation, and has been erected in the quarry area.

Quarry loading is handled by a 1½-cu. yd. Northwest 80D shovel, and the material hauled to the nearby primary crushing plant in 18-ton end-dump Eucs. As at Masten Lake, the natural terrain was used to advantage in avoiding the necessity of building a haulage ramp to the hopper. A haulage road was graded at about the same level as the quarry floor, and the hopper was installed at the same elevation.

Quarry-run rock is transferred from the hopper *via* a 24-in. Pioneer apron feeder to a 2436 Pioneer jaw crusher. Driven by a 100-hp. motor, the crusher is set for reduction to minus 6 in. Crusher discharge is conveyed to a single-deck screen mounted above a set of truck-loading bins. A split is made at 1⅛ in. The larger fraction is feed for the secondary plant, and the throughs are sold as crusher-run. This primary plant was built by the plant crew.

The 3x1⅛ material is trucked to the secondary plant site, where it is dumped on a surge pile above a reclaiming tunnel. The latter is 9 by 12 ft. in cross-section, 52 ft. long, and houses a 4- by 6-ft. F55 Syntron feeder rated at 500 t.p.h. Minus 6-in. material delivered by the feeder from the overhead surge is received on 30-in. belt No. 1 and carried to "A" screen. This 4- by 8-ft. double-deck unit scalps off plus 3-in. rock on the top deck, and makes a 2½-in. split on the bottom.

The former is chuted directly to the secondary crusher—a 4-ft. Telsmith Gyrasphere driven by a 150-



A SURGE PILE for secondary plant feed is maintained over the reclaiming tunnel, center. The stone is trucked from the primary crusher.

FINISHING SCREENS are mounted in series above the bins. At the right is the tertiary cone crusher, and at the left the classifying screw and stacker for handling the finest fraction.

SUPERINTENDENT of production at Bridgeville is Hugh Myers.

Right:
A CLOSE-UP of the secondary crushing and screening phase at Bridgeville.

hp. motor. Material retained on the lower deck of "A" screen may also be chuted to the secondary crusher, or to No. 3 belt along with the bottom deck throughs. Products of secondary reduction (minus 1½-in.) are returned on 24-in. wide No. 2 conveyor to the "A" screen feed belt.

Conveyor No. 3, also 24 in. wide, feeds "B" screen, which is mounted in tandem with "C" screen above a set of loadout bins. "B" screen is a 5- by 14-ft. double-deck unit fitted with spray bars, and "C" is also a double-deck screen, but 4 by 14 ft. The former makes an $^{11}/_{16}$-in. separation on the top deck, but has a split lower deck with ⅛- and ⅜-in. openings.

The top deck fraction may pass to the following screen, or drop into an underlying bin compartment. Material retained on the bottom deck may also do either. The ⅜-in. fraction passing the bottom deck drops into a bin, and the ⅛-in. material is flumed to a 30-in. by 25-ft. single-screw McLanahan & Stone washer. This, in turn, discharges to conveyor No. 6, an 18-in. by 100-ft. stationary stacker.

Only the top deck of "C" screen is used, and the split of feed from "B" screen is made at 1¼ in. Overs are dropped into a bin from which they may be drawn for feed to the tertiary crusher—throughs are dropped into an adjoining bin compartment.

Feed for the 36FC Telsmith tertiary crusher is delivered on belt No. 4. Products of tertiary crushing (minus ¾-in.) are received on conveyor No. 5 and returned to the "B" screen feed belt.

As at Masten Lake, all shipments from Bridgeville are made by truck, with direct loading from bins, or from stockpiles with Michigan 175A loaders. Operations, which started last June, are headed by Hugh Myers, production superintendent.

Officers responsible for the optimistic long-range planning, which has doubled the firm's capacity in highway materials and other aggregates, include Clifford Poley, president; Walter C. Toaspern, vice-president; Edson J. Tegeler, secretary-treasurer; Herman H. Bulken, business manager; and Fred Standinger, assistant general manager.

$1,000,000 Dust Control Plan Set by Universal Atlas Cement

Universal Atlas Cement Division of U. S. Steel Corporation will conduct a $1,000,000 air pollution control program at its Northampton, Pa., plant. The program is aimed at total possible efficiency in dust control.

Gas bag collecting houses (similar to the one in operation on the No. 2 kiln) will be built for the white cement kiln and kilns No. 3 and No. 4. The program calls for a new unit every two years, with final installation in 1966.

A 10-story dust collection unit installed last year is giving satisfactory service; the Transite-encased bag house cost $300,000. Smoke and dust are captured by 540 Fiberglas bags on the top level of the building and are reclaimed *via* hoppers. Presently, dust from the other three kilns is collected by electrostatic precipitators.

Glacier Sand & Gravel Company, Seattle, Wash., has purchased a 500-ton capacity Noble batching plant and a T. L. Smith turbine-type mixer with a capacity of three cu. yd. per 40 seconds. Site preparation is under way at Glacier's North Lake Union property.

British Agstone Producer Really Sells and Services with

18 producing plants *150 four-wheel drive spreaders*

4 mobile soil-testing labs *55 full-time salesmen*

A provocative illustration of what can be done in the field of aglime sales was pointed up for the United States limestone industry by a recent visitor from England. Sales of 500,000 tons of agricultural limestone and a staff of 55 aglime salesmen sounds far-fetched to American limestone producers; but these and other startling facts were revealed as actualities by Kenneth Selby, managing director, Wessex Spreaders Ltd., Bath, Somerset, England, during his visit to the United States.

Mr. Selby, a dynamic former Rugby star, spent several weeks visiting such prominent limestone firms as Swanton Lime Works, Inc., Swanton, Vt.; M. J. Grove Lime Company, Lime Kiln, Md.; Fry Stone & Coal Co., Mercersburg, Pa.; Harry T. Campbell & Sons, Towson, Md.; and American Limestone Company, Knoxville, Tenn. He was in quest of new ideas and methods to improve his firm's over-all aglime sales and service. Actually, he found little in this country to add to his progressive sales program.

Less than nine years ago Mr. Selby, aggressive manager of The Bath and Portland Stone Firms, Ltd., in southwestern England, saw the possibility of a huge market for aglime which at that time was a by-product of their building organization. Today he directs a string of 18 plants (mainly producing agricultural limestone) which utilize the year-round service of 55 salesmen, four girl-operated mobile soil-testing labs, and 150 radically designed four-wheel-drive spreaders. He is about to launch a concerted drive to supplement his enterprising operation with the manufacture and sale of liquid and solid fertilizers.

Kenneth Selby (left) visited with Robert Koch, president, National Limestone Institute, Washington, D.C., and discussed the organization's many promotional aids. Mr. Selby attributes his tonnage figures to customer service and door-to-door calls.

The British Government provides assistance similar to U. S. aid to farmers in the purchase of agricultural limestone. Unlike the United States, however, the British Government sets a maximum price on the material based on cost of production, spreading charge, and haul. Aglime in England is permitted on any crop the farmer desires and at any time of the year.

Mr. Selby, who also directs the firm's building and engineering divisions, says quarrying methods vary considerably from ours. In England it is possible to enter a field and remove an overburden of 6 in. or less to get at limestone so soft that it requires only a tractor-drawn disk harrow to loosen it. This material is shoveled onto a conveyor with a front-end loader which carries it to a screen above the stockpile. This operation requires the services of two

The largest single innovation which Mr. Selby feels the American producer can incorporate is a spreader like his own, which applies limestone throughout the entire year.

Left: Here Mr. Selby is discussing American marketing procedures with Malcolm Barger, the M. J. Grove Lime Company, Frederick, Md.

Right: At the Fry Coal and Stone Company, Mercersburg, Pa., the British visitor conferred with C. H. Hunsberger (center), sales manager, and J. L. Wilson (left), agronomist.

men and can yield 10,000 to 15,000 tons per year.

At nine of Mr. Selby's 18 plants regular blasting is done in quarries with 18-ft. faces. Rather than load the blasted limestone into trucks for haul to the crusher, it has been found economical to load the stone directly onto conveyor belts which are lengthened as the quarry deepens and thus convey the stone directly to the crusher.

Mr. Selby attributes his tonnage figures to customer service and door-to-door calls. He estimates that his Wessex and AgriLime firms (which sell in central England) had sales exceeding 500,000 tons of aglime and 220,000 tons of chemical stone during 1959. And in England the long ton—2,240 lb.—is used.

It is Mr. Selby's conviction that his 55 salesmen should average calls on ten prospective users of his material daily, and that they should average 8,000 tons of aglime sales yearly. Says he, "If my travelers see ten farmers daily, that's 550 possible customers who were offered our material." When the fertilizer lines are placed in full operation, it should double his salesmen's effectiveness, Mr. Selby feels.

The chemical stone tonnage will find its way to blast furnaces, foundries, and asphalt and mineral filler applications. Mr. Selby indicates a small amount of the lime is burned, but this is used solely to aid in the overnight drying of the aglime before it is crushed. The moisture content of the English aglime, which tests an average 98.5 percent $CaCO_3$, is 18 percent. The government requires 2 percent moisture for spreading.

The progressive Selby approach has made this company the largest producer of agricultural limestone in Great Britain and the second-largest distributor. England's soil currently has an aglime deficiency of 40,000,000 tons and is receiving an application of five of the seven million tons required annually. This is far better than the U. S. yearly average of 22 out of 80 million tons.

With England's land situation growing critical, the government has adopted these practices: removing farmers from their land if they are inefficient; prohibiting spreading housing developments which consume valuable farm acreage and thus encouraging apartment-type communities; and providing a subsidy for all fertilizers except potash, which is imported from Eastern European countries.

The Selby aglime companies will all be under the same name of Soil Fertility Ltd. as soon as the fertilizer company and more efficient spreading and soil-testing services become interwoven with the firm's efficient producing and hauling services.

The largest single innovation which Mr. Selby feels American producers can incorporate is a spreader like his own, which can apply limestone all year long. He feels that spreaders can be used more efficiently in the United States.

In the Selby organization small, light, four-wheel-drive trucks of 5-ton capacity are left throughout the spreading area, and lime is hauled to them on flat trucks. The limestone is then hand-shoveled from lorry to spreader.

The spreaders are operated by diesel engines, which are 30 percent more efficient than ours due to the high (up to 75 cents per gallon) cost of gasoline used here.

A closeup view of one of the 150 four-wheel-drive spreaders utilized by the British concern. The units are built to a radical design which permits year-round operation.

RUSSELL E. LIND, operator of the Lind Sand and Gravel Company, Bellingham, Wash., died recently in a local hospital. He was 63 years old.

Canadian Institute of Mining and Metallurgy Meets in Toronto

Miron's new cement plant, new gypsum, lime, and bentonite operations described

WITH a record registration of 3,400 delegates, the 62nd annual general meeting of the Canadian Institute of Mining and Metallurgy was held in Toronto on April 25, 26 and 27. The Toronto Branch of the institute was host, and headquarters were in the Royal York Hotel. Meeting with C.I.M.M. were the Geological Association of Canada and the Mineralogical Association of Canada.

The inaugural general session, which was presided over by the president, J. C. Sproule of Calgary, consisted of a symposium on *Mineral Energy Sources—Present and Future* and included papers on coal, oil and gas, and uranium.

W. H. Durrell, Montreal, executive vice-president of Hollinger-Hanna Limited, was installed as C.I.M.M. president for 1960-61. Mr. Durrell is well known in the institute and throughout the mining industry, where he is recognized as one of the pioneers of the iron ore industry in Quebec.

At the conclusion of the meeting a conducted tour was made to Hamilton, where the Dominion Foundries and Steel Company plant and the adjoining new urea plant of Cyanamid of Canada were visited.

Over 100 papers were presented at the technical sessions. Extracts from some of the papers which are of particular interest to readers of PIT AND QUARRY are given here. Most of these were presented before the Industrial Minerals Division.

At the business meeting of the Industrial Minerals Division, Earl Whimster, geologist, Canadian Pacific Railway Company, Toronto, was elected chairman of the division for 1960-61, succeeding W. T. Bray.

The panel discussion on developments and operating problems in the industrial minerals industries, which had proved so successful last year, was continued and it proved to be equally successful this year.

Cyanamid Lime Plant O. O. Schaus, manager, Technical Department, Cyanamid of Canada Limited, in a paper entitled *Canada's Newest Lime Plant — a Product of the Mining Industry*, described his company's new rotary-kiln plant at Beachville, Ontario*.

*See PIT AND QUARRY, May, 1959, page 146-150.

W. H. Durrell, newly elected president of Canadian Institute of Mining and Metallurgy, 1960-61.

This plant, built in 1957 to supply the large demand for lime from the new oxygen process of steel making and from the uranium industry, consists of a coal-fired F. L. Smidth rotary kiln 350 ft. long by 10½ ft. in diameter. It has a capacity of 325 tons of lime per day. It is equipped with Unax coolers and employs a Smidth ball mill coal pulverizer. High-calcium limestone for burning is obtained from the adjacent quarry, which has been operated for many years to supply the company's other lime plant at Niagara Falls.

Considerable experimenting has been done with refractories. At present 70 percent alumina refractory is used for 60 ft. from the firing end; the next 230-ft. section is lined with 40 percent alumina brick, and the remainder with wear-resistant refractories. A short test proved 85 percent alumina brick to be unsatisfactory in the firing zone. Experimentation was also done on the effect of stone size in the feed and on the range of stone size upon the capacity and efficiency of the kiln. The results indicated that above 1 in. and up to 2 in. the ratio of the largest to the smallest piece should be the normal 2:1; but below 1 in. a ratio of 1½:1 is more satisfactory.

Miron Cement Plant E. G. Swenson, director of research for Miron & Freres, Limited, Montreal, in his paper, *The Miron Cement Plant at Montreal*, described the latest cement plant to begin operations in Canada. Outstanding items include the high de-

gree of automation and the huge kiln.

The kiln, made by Allis-Chalmers, is 550 ft. long and 15 ft. in internal diameter. It is believed to be the largest dry-process kiln in the Western Hemisphere, and it is expected to have a maximum capacity of 4,000,000 bbl. per year. It is fired with natural gas. The dust collection system, which includes a large Cottrell precipitation unit, is rated as one of the most nearly complete in the industry.

The plant is situated on the floor of the Miron limestone quarry at St. Michel on Montreal Island, and is adjacent to the concrete products plants. The latter turns out ready-mixed concrete and concrete block and pipe. Miron also makes crushed stone aggregate, and operates an asphalt plant.

Limestone and shale are trucked to the primary crusher plant, which also serves the concrete aggregate plant. All minus ¼-in. material from the primary crushing plant is discarded. The kiln feed, after being reduced to minus ⅜ in. is fed to several storage silos simultaneously to reduce to the minimum any difference in composition of the limestone as obtained from the quarry. The same procedure is followed for shale.

Proportioned raw materials are fed to 2-compartment ball mills 12 ft. in diameter and 34 ft. long, driven by 2,500-hp. synchronous motors. Discharge from the ball mills goes to air separators operating in closed circuit and thence by air lifts to blending silos. Oversize is returned to the ball mills. The floors of the blending silos are constructed of special porous blocks through which air is introduced to create an air pad which keeps the contents of the silos in a continuous state of fluidization.

Kiln feed is withdrawn from the bottoms of the silos and pumped to a surge tank at the kiln, where it is also kept fluidized by an air pad. From the surge tank the kiln feed is air-lifted to a constant-head feeder and thence to the kiln by screw conveyor. A drop of only 6 in. to the kiln lining and a special deflector plate reduce any feed disturbance by kiln gases.

The kiln is rotated by dual drives, each powered by a 200-hp., d.c. motor synchronized with the feed motors. Kiln speed can be varied from 0.5 to 1.3 r.p.m. The fuel is natural gas. A stand-by oil-burning unit is available for emergencies. Exit gas temperature is 1,100 deg. F. Dust is removed by a gravity dust collector, a Multiclone, and a Cottrell precipitator. The gas reaching the 400-ft. stack has a temperature of about 700 deg. F. Mechanically collected dust is air-lifted to the feed silos, but precipitated dust is discarded on account of its high alkali content.

Hot clinker from the kiln goes to a large quencher cooler, in which a fan forces cooling air through the hot clinker bed. A part of the hot air from this unit goes to the kiln as secondary air for burning. Cooled clinker goes to clinker storage before being ground. It cannot be routed directly to the ball mill. Finished cement is air lifted to any one of 13 silos, where it is kept partly fluidized by air pads to facilitate withdrawal for bagging or for bulk shipment.

J. C. Sproule, retiring president of the Canadian Institute of Mining and Metallurgy.

Rock Salt Production of rock salt in Canada has risen very rapidly in recent years, due largely to the operations of the Canadian Rock Salt Company. In a paper entitled *The Origin and Mining of Rock Salt Deposits in Canada*, W. M. Rice, mine manager for the Canadian Rock Salt Company, Limited, Ojibway, Ont., described operations at the Ojibway mine and also at the Pugwash, Nova Scotia, mine of the Malagash Salt Company, Limited. (Both companies are subsidiaries of The Canadian Salt Company, Limited.)

At both Ojibway and Pugwash the ground above the salt beds presented almost insurmountable problems to shaft sinking by standard methods; so special methods had to be employed.

The 1,100-ft. shaft at Ojibway had to be sunk through 100 ft. of glacial drift, 266 ft. of limestone, 74 ft. of water-bearing sandstone, 120 ft. of water-bearing limestone, and 540 ft. of water-free limestone to the salt bed. Because of the heavy flow of water from the water-bearing sandstone and limestone, it was decided to use the Poetsch freezing method to prepare the ground for shaft sinking. By this method a solid column of ground was frozen to a depth of 750 ft.—well below the lowest aquifer—and the 16-ft. circular, concrete-lined shaft was sunk through the frozen ground.

At Pugwash the salt bed lies only 350 ft. below the surface, but much of the ground above the gypsum that overlies the salt consists of unconsolidated water-bearing sediments. Here the shaft was sunk by grouting successive sections of the soft sediments with cement. The grout was introduced through drill holes sloping outwards around the periphery of the shaft excavation. By this means a large cone-shaped area of unstable ground was consolidated, and the shaft was sunk to a point near the bottom of it. By repeating this procedure many times, the shaft was completed. The Pugwash shaft is rectangular and is lined with reinforced concrete.

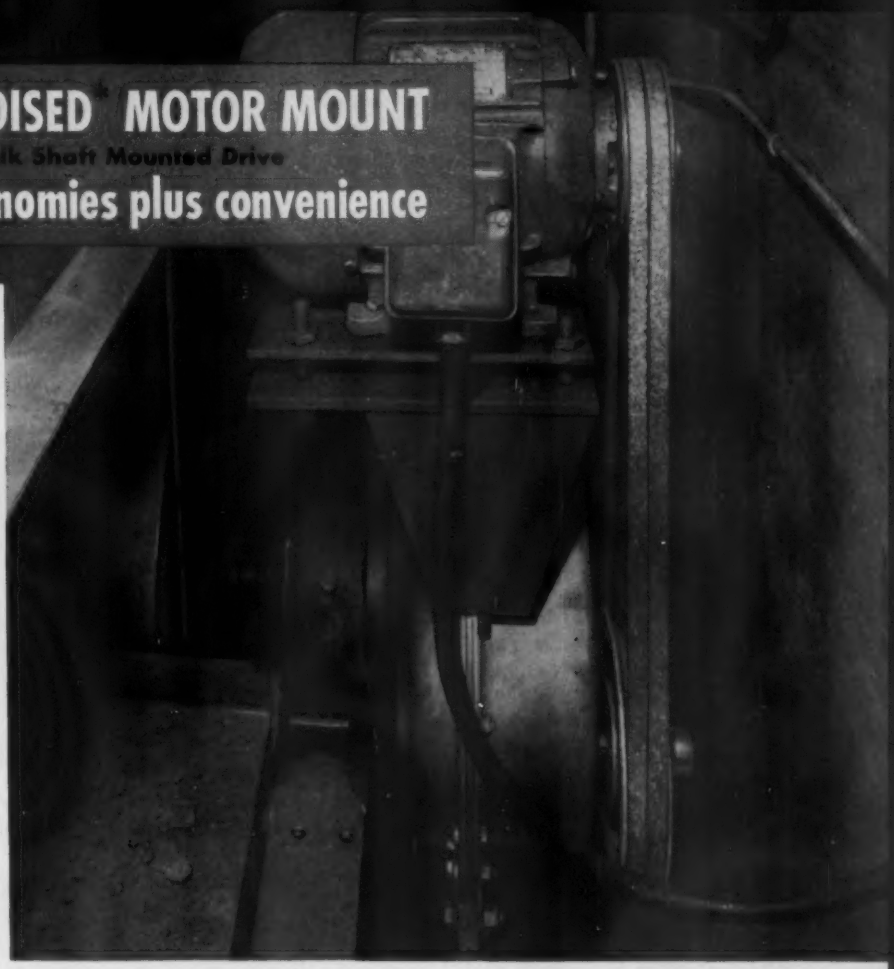
Trackless mining and the room-and-pillar system are used at both mines. At Ojibway, where the horizontal salt bed being worked is 27 to 30 ft. thick, about 6 ft. of salt is left on the roof. Rooms are 50 ft. wide, and the pillars between the rooms are 50 ft. thick. At Pugwash the rooms are initially cut 40 ft. wide and will eventually have a height of 40 ft., although at present they are only 20 ft. high. Haulageways are

Enter 91 on card, page 145 →

NEW FALK EQUI-POISED* MOTOR MOUNT

for use with the Falk Shaft Mounted Drive

gives unequaled economies plus convenience

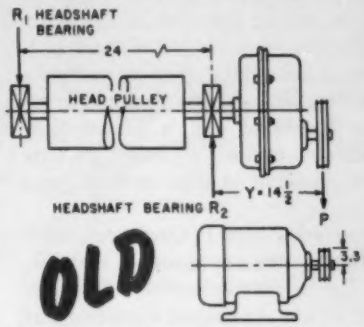


HOW A FALK EQUI-POISED MOTOR MOUNT REDUCES BEARING LOADS ON A DRIVEN MACHINE

GIVEN: Motor—15 hp, 1750 rpm, Frame 284U, Weight—320 lb. Sheave diameters—6.6/9.4 Driven machine—belt conveyor with 24" center distance between headshaft bearings.

NOTE: Weights of 307J24 Shaft Mounted Drive, sheaves, and V-belts are eliminated from calculations because they remain constant; do not affect the comparison.

WITHOUT FALK MOTOR MOUNT



Torque at motor shaft = $\frac{63{,}025 \times 15 \text{ hp}}{1750 \text{ rpm}} = 540$ lb-in.

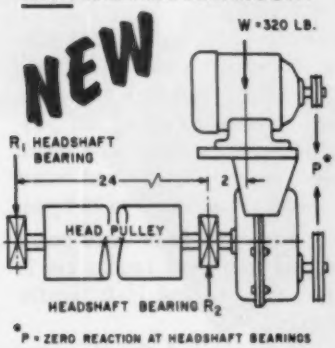
Belt pull (P) = $\frac{540 \text{ lb-in.}}{3.3"} \times 1.5$ Load Connection Factor = 246 lb

$R_2 = \frac{246 \text{ lb} \times (24" + 14.5")}{24"} = 395$ lb

$R_1 = \frac{246 \text{ lb} \times 14.5"}{24"} = 149$ lb

(Check: 395 lb—149 lb=246 lb)

WITH FALK MOTOR MOUNT



*P = ZERO REACTION AT HEADSHAFT BEARINGS

V-belt pull has zero reaction on headshaft bearings. Therefore—

$R_2 = \frac{320 \text{ lb} \times (24" + 2")}{24"} = 347$ lb

$R_1 = \frac{320 \text{ lb} \times 2"}{24"} = 27$ lb

(Check: 347 lb—27 lb=320 lb)

Falk's new EQUI-POISED* Motor Mount is a rigid, all-steel weldment, pre-drilled for bolting standard NEMA foot-mounted motor (1/2 to 30 hp) directly to the steel frame of Falk Shaft Mounted, Flange Mounted and Screw Conveyor Drives. With it, motor can be mounted in almost any position around perimeter of reducer.

(*Balancing of forces.)

Substantial Savings for You

It saves engineering time required to design special motor bases and foundations...saves cost of labor and materials required to build special motor foundations...and saves on equipment costs by using a quality stock component. Further, its quick installation and easy maintenance mean added cost savings. The Motor Mount is a space saver, too. Where restricted space is a factor, ability to mount motor in any of several positions is an important convenience...For information on range of sizes, dimensions, etc., contact your Falk Representative or Distributor—or write direct for Bulletin 7100.

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24 ft. wide at Pugwash and 30 ft. wide at Ojibway.

Rubber-tired, rear-dump diesel-powered haulage units, holding 18 tons each, carry the mined salt to the primary crushers, which are underground. The salt is loaded on the diesel wagons by mechanical loaders that can each handle 14 t.p.m. The salt is crushed underground to 2½ in. and hoisted to the surface in 10-ton, bottom-dump skips designed to handle 500 t.p.h.

At the surface the salt is crushed and screened to the desired sizes and shipped in bags or in bulk. Much of the salt from both mines is shipped by water.

A feature of the milling process is the compaction method of converting unwanted fines into salable products. In this method the fines are passed between two 24- by 24-in. smooth rolls turning at 28 r.p.m., in which they are subjected to a momentary pressure of 21,000 lb. per lineal in. and emerge as a ribbon of compacted salt. This material, after a short curing period, is crushed to the required particle size.

Natural Gas *The Economics and Utilization of Natural Gas in Industrial Mineral Plants* by D. J. Gallen of Northern Ontario Natural Gas Company, Limited, dealt with the replacement of coal and fuel oil by natural gas as fuel in rotary kilns producing lime and cement; in the recovery of lime from pulp mill waste; and in the drying of asbestos rock in vertical dryers, as well as for other purposes.

Although in some cases there is little (if any) difference in costs on a B.t.u. basis, savings can be made in labor and upkeep through the use of gas. Lack of contamination by natural gas is also an important factor. Mr. Gallen stated that although all fuels theoretically require about 1 cu. ft. of air per 1,000 B.t.u.'s to obtain good combustion, gas is the only fuel that can be readily applied and burned with the minimum amount of excess air. In concluding his paper, Mr. Gallen said that there are many different kinds of combustion systems, and that the one chosen should be designed for the particular application and should work within the total requirements of the operation.

Glass Sand One of the few potential sources of glass sand in Canada was described by G. H. Reavely and C. G. Winder, department of geology, University of Western Ontario, London, Ont., in their paper on *The Sylvania in Southwestern Ontario.* They stated that the Sylvania sandstone in Canada is found almost exclusively in Essex County. Here the deposits form the southeasterly edge of a great lens of sandstone occurring in Michigan, where it is worked as a source of pure silica sand.

The Sylvania does not outcrop in Ontario, and its extent has been delimited almost entirely from drillers' records. Its maximum known thickness in Ontario is 125 ft. It is composed of well rounded, clear quartz grains cemented with varying quantities of carbonate. The thickness of the deposit varies widely within a short horizontal distance.

In Michigan the Sylvania sandstone has been quarried for many years in the vicinity of Rockwood, Wayne County. It has not been quarried in Ontario, but its location adjacent to lake shipping facilities, rail transportation, and main highways provide an economic advantage over the United States deposits. Analyses show it to contain from 0.04 to 0.29 percent of Fe_2O_3 and generally a considerable percentage of carbonate of lime and magnesia, impurities which would have to be reduced by beneficiation before the product could be marketed as glass sand.

Additional problems are the depth of soil and limestone above the sandstone, and the high porosity of the sandstone. This characteristic would permit rapid infiltration of water from the nearby Detroit River and would create insurmountable problems for any quarry operation. The authors stated that the sandstone may outcrop beneath the waters of Lake Erie, not far from the Ontario shore.

Bentonite *Development of Canadian Bentonite for Canadian Industry,* a paper prepared by Roy Wolke, Arthur Zrimsek, and George Vingas of Magnet Cove Barium Corporation Limited, described a new industry at Rosalind, Alberta. Nine miles south of this point a nearly horizontal bed of sodium bentonite, 3 to 10 ft. thick and covered with 15 to 25 ft. of overburden, is being mined by the open-pit method. It is processed at the plant in Rosalind for use in oil-well drilling, foundries, and for ore pelletizing and other minor uses.

After the removal of overburden the bentonite is excavated by dragline and taken by truck to the plant at Rosalind, where it is stockpiled. Variations in the bentonite necessitate different stockpiles for each use. The material is taken from the stockpile, chopped into small chunks, and fed to a rotary dryer fired by natural gas. Here the moisture content is reduced from 40 percent to 10 percent without heating the bentonite above 250 deg. F.

Further drying to from 6 percent to 9 percent takes place when the bentonite goes to a Raymond mill, which has a flash dryer connected to it. The finely ground bentonite from the Raymond mill is passed to a collector cyclone and then to bins for shipment in bags or bulk.

Gypsum Plant Zolton F. Oszter described the expansion of the Calgary plant of Gypsum Lime and Alabastine Limited from a one-kettle gypsum operation to a three-kettle calcining plant and a gypsum wallboard manufacturing plant, at a cost of $2,500,000. Mr. Oszter is affiliated with the Foundation of Canada Engineering Corporation Limited, the firm that designed the new plant. Many features developed by Gypsum Lime and Alabastine at their other plants across Canada were incorporated in the new plant.

The two new calcining kettles have suspended shells, permitting the refractory brickwork to be replaced without disturbing the paddles, flues, and drives. The board machine is 450 ft. long and board belt speeds range from 5 to 75 f.p.m.

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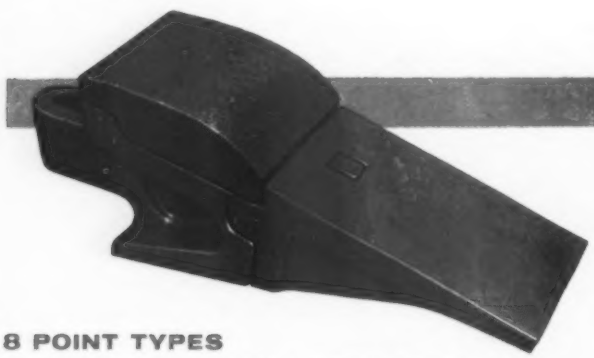

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N.L.I. Divisional Boards Hold Joint Midyear Session

By BUREN C. HEROD

NEARLY 50 National Limestone Institute members on the agricultural limestone division and the crushed limestone division boards of that group held a joint mid1year session at the Edgewater Beach Hotel, Chicago, on June 13-14. Overall policies and objectives of the institute, as well as of the separate divisions, were reviewed in terms of both national and local expression.

With Arthur R. Alvis (Alvis Limestone and Concrete Products, Butler, Mo.), N.L.I. chairman, heading all sessions, the executive committee met to consider the association's internal business and the reports of standing committees which convened on the first day. These reports were then made to the full boards in a joint final session.

This was the first mid-year meeting of the divisions' boards since the merger of N.A.L.I. and N.C.L.I.; and with the details and problems attending the consolidation resolved, the directors had more opportunity to deal with broader objectives. Although provision had been made for separate meetings of the two boards, if desired, the groups remained together and found no obstacle to joint consideration of common problems.

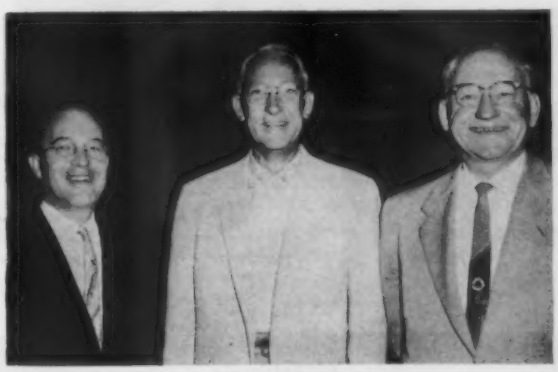
On the recommendation of the A.L.D. and C.L.D. bylaws committees, the boards approved an increase to four in the number of manufacturers' division representatives on the N.L.I. boards.

Leonard Fry (Fry Coal & Stone Co., Mercersburg, Pa.) presented the recommendations of the convention arrangements committees for the two divisions. As approved, the 1961 annual convention will again be held at the Statler Hotel in Washington, D. C., with board meetings on January 16, and general sessions from January 17 to 19. The 1961 mid-year meetings of the boards will be in mid-June, and again in Chicago.

The A.L.D. legislative, public relations, and tax committee report was presented by Chairman Powell G. Potts (Southern Stone Company, Inc., Franklin, Ky.). It was noted that activity in the area of percentage depletion is currently in abeyance, pending the Supreme Court's decision in the Cannelton Sewer Pipe Company case. In another area, however, it was reported that N.L.I. activity in opposing H.R. 9070 (the construction site picketing bill), in conjunction with other groups opposing that proposed legislation, was successful.

A proposed reduction in A.C.P. funds from $250 million to $100 million for 1961 was also defeated, due in considerable measure to testimony before Congressional sub-

(*Concluded on page* 115)



Arthur R. Alvis (Alvis Limestone & Concrete Products, Inc., Butler, Mo.), center, chairman of N.L.I., was presiding officer for the two-day board session. At the left is Robert M. Koch, N.L.I. president; at the right, first vice-chairman L. R. Falk (L. R. Falk Construction Co., St. Ansgar, Iowa).

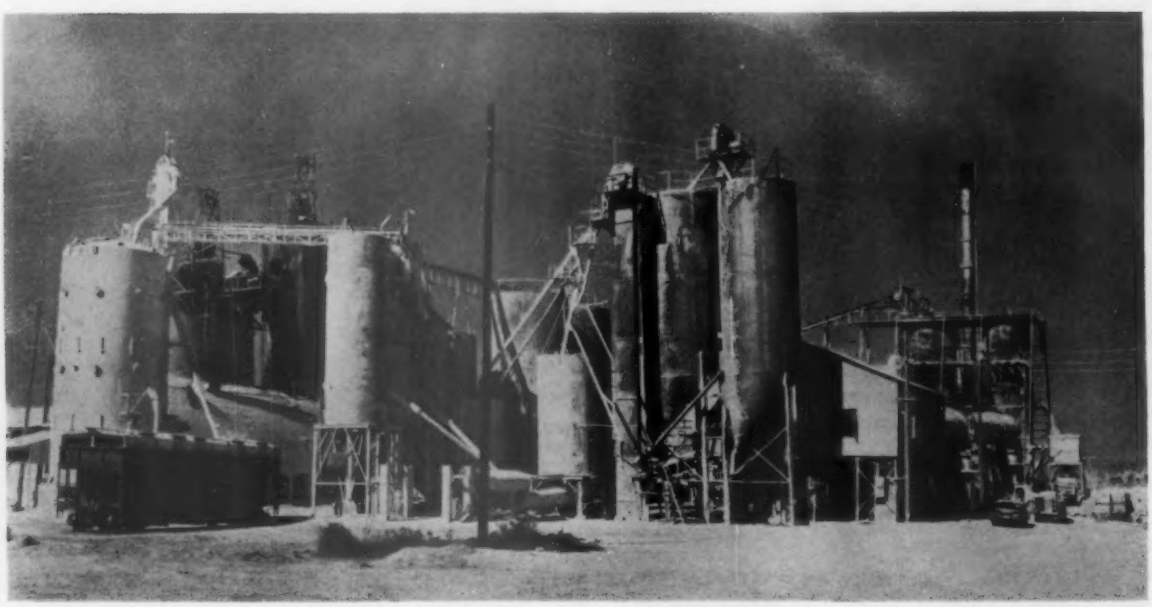
Members of the N.L.I. executive committee present included (l. to r.): L. R. Falk, Iowa; Powell G. Potts, Kentucky; Thomas E. Lalley, Pennsylvania; Arthur R. Alvis (chairman), Missouri; George A. Ziegler, Maryland; Robert O. Bemis, Ohio; John H. Riddle, Kansas; and Robert M. Koch, president, Washington, D.C.

Historic

The old and the new. At the left and right are two of the old stone kilns—reminders of the long history of this operation. In the foreground is the rotary kiln stone feed belt, a part of the modernized material-handling system. The stack for the new kilns is in the background.

By BUREN C. HEROD

Appropriately, the new high-capacity equipment overshadows the older calcining installation in this overall view of Round Rock's impressively expanded operations. From the center to the right are the pebble lime storage tanks and the new rotary kilns. At the left, behind the tanks, two of the shaft kilns can be seen.



Lime Operation Modernized

emphasis on quality, plant improvements mark striking progress

A LONG history, "new blood," and "growing pains"—all have a place in a description of Round Rock White Lime Company operation at Round Rock, Tex. The latter two, in particular, reflect the emergence of a modern lime production facility from a background of obsolescent methods and equipment, some of which date from the last century.

The new blood referred to entered the picture about eight years ago when D. L. Pickett, general partner, and colleagues acquired the Round Rock organization. Growing pains relate to the fact that when the new owners took over, the operation had a capacity of 75 t.p.d. in four old stone kilns and two steel shaft units, and that by the end of last year, when two rotary calciners went on the line, this figure had been raised to 500 t.p.d. This record is even more striking in view of the almost complete lack of lime experience on the part of the new owners when they took the reins.

Things began to happen fast back in 1953, however. First, the two old 11- by 50-ft. steel kilns (dating from 1905) were revamped and converted to natural gas firing. At about the same time a third, larger steel shaft unit (11 by 16 ft. in cross section and 110 ft. high) was added. This program raised total capacity to somewhat over 175 t.p.d. of quicklime.

Attention was then turned to the hydrate department — which consisted of one old hydrator, one mill, and limited storage. Expansion involved the addition of two more hydrators, three more mills, and ample storage facilities. Coupled with this step was the installation of efficient material-handling systems.

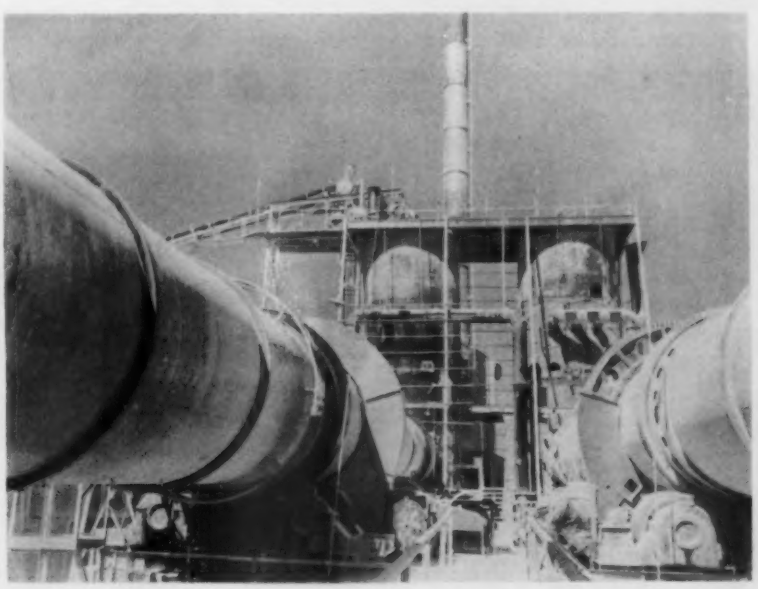
Management had obviously learned rapidly, but continued to press forward toward even higher goals of production efficiency and capacity. These objectives focused attention on the possibilities of a rotary kiln installation both to utilize small stone and to take advantage of market potentials.

The decision was made to add rotaries, and construction of the new phase was started late in 1958. By May, 1959, the first of the two 8- by 150-ft. kilns was in operation. Completion of the second, late last year, brought the firm's total capacity up to 500 t.p.d. Each of these new units is rated at 150 t.p.d.

A major consideration leading to the expansion was the potential of the lime stabilization market, one that now shows promise of becoming the largest single use category in Round Rock sales. Other major areas include chemical and building lime applications.

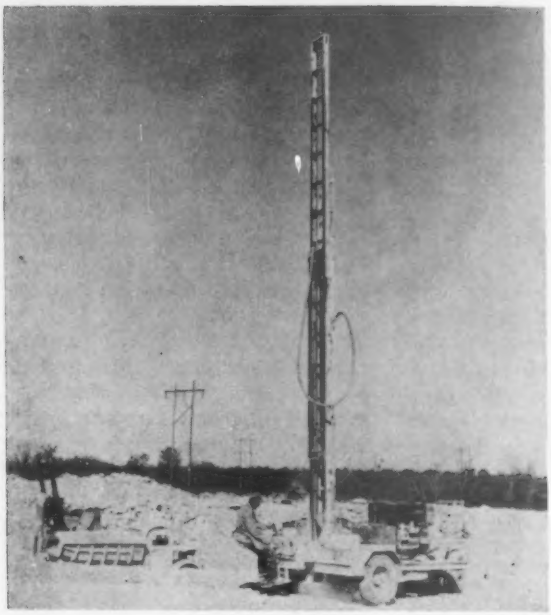
"Quality, not quantity," is management's philosophy, Mr. Pickett has indicated. With the new high level of productive capacity, and with finished products testing from 95 to 97 percent available CaO, there would seem to be no problem in meeting either condition.

(*Turn Page*)

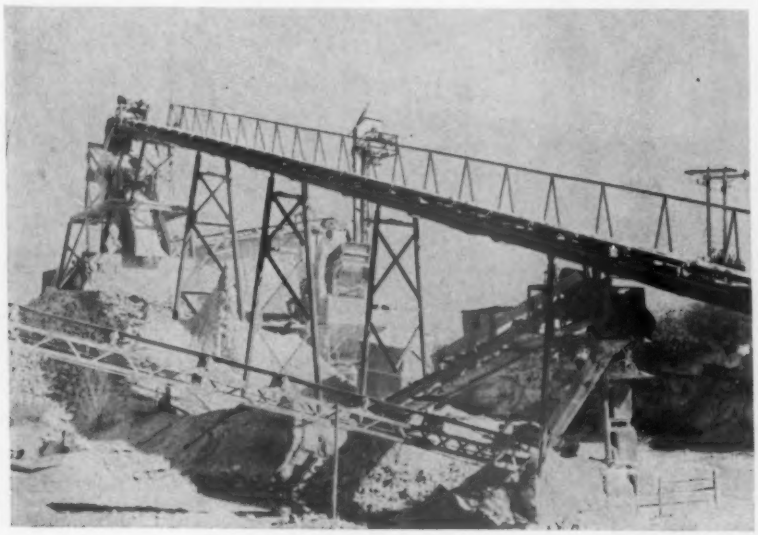


The kiln and preheater at the left were in operation, and the units at the right were in the last stages of installation when this photo was taken. At the upper left is the belt transporting rotary kiln feed stone from the storage pile. At its discharge point is a screen for the removal of fines—the third screening step in preparation of this feed.

D. L. Pickett, right, general partner in the Round Rock management group, and C. S. Boyd, superintendent, played leading roles in the transformation of the historic operation to an efficient, modern facility.



Quarry operations involve a face between 20 and 24 ft. in height. The drill is sinking 3-in. blastholes on the ledge above the shovel and quarry truck.



The primary screen at the upper left removes the plus 3-in. fraction from the crusher-run. It is discharged onto a ground pile, from which it is recovered in a reclaiming tunnel and discharged into trucks via the belt at the right center, for transport to the plant.

Concentration on quality control is highlighted by the fact that this operation is reportedly the only lime plant in the state in which rotary kiln feed undergoes scrubbing. This is in addition to two preceding screening steps and a final one.

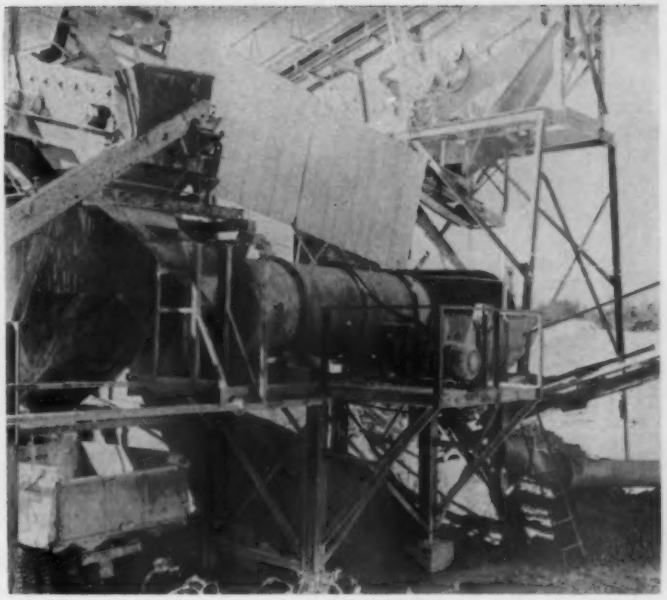
Stone reserves in the more than 400 acres in the property are sufficient for peak operation of all kilns for over a century. The limestone used is from the Edwards formation exposed in the Balcones escarpment, a widely used, top-quality raw material. Less than 10 percent of the area originally available to the Round Rock operation has been excavated, and very little stripping is required.

Quarrying operations involve a 20- to 24-ft. face created by drilling 3-in. blastholes on a 9- by 11-ft. pattern (for the larger shots). The Damco Rotary Blastholer used in the drilling operations has a normal penetration rate of 20 ft. in 4 minutes. The holes are charged with one to three sticks (when water is present) of Olin 1A Mine Gel at the bottom, and for the remainder with Monsanto fertilizer grade ammonium nitrate. Charges are detonated with millisecond caps. Drilling and blasting cost has averaged less than five cents per ton of broken material.

The latter is loaded out by a ¾-cu. yd. Northwest shovel and hauled to the crushing and screening plant by 15-ton Euclid end-dump trucks. At the primary crushing installation, equipped with Pioneer components, an apron feeder transfers the quarry-run stone to a 2436 jaw set for reduction to 6-in. maximum.

Crusher-run is conveyed to a 4- by 12-ft. double-deck Diamond screen. Stone retained on the 4-in. opening top deck and 3-in. opening bottom deck of this unit is chuted to a surge pile of shaft kiln feed stone. In an underlying reclaiming tunnel, a Syntron feeder delivers this plus 3-in. material to a loading belt for truck haul to the shaft feed hopper.

From the primary screen, upper right, rotary kiln stone is delivered to the screen at the upper left, which is closed-circuited with a secondary crusher. The final sized feed is then scrubbed, center, before transport to a storage pile.



Throughs from the above screen are delivered to a following 4- by 12-ft. Simplicity single-deck screen with a split deck having ½- and 1½-in. openings. The fraction passing the smaller openings drops to a pile of fines. All retained material is chuted to a Universal hammermill secondary crusher, and the product of the latter is returned to the single-deck screen in closed circuit *via* bucket elevator.

The 1½- by ½-in. stone passing the last section of the secondary screen is delivered to an Appco scrubber which, in turn, discharges into a loading bin of rotary kiln stone.

This scrubbed material is trucked to a surge pile built up over a 140-ft. long reclaiming tunnel, housing the first section of a 24-in. wide conveyor. Thirteen draw points are provided, all equipped with clam-shell gates. In order to recover the driest stone, draw is made (at 2-hour intervals) from successive gates. The reclaiming belt delivering the stone to the preheater feed bins of the new rotary kilns is 360 ft. from tail pulley to discharge point.

Before entering the preheaters, the feed is passed over a screen for removal of any minus ½-in. fines. (This comprises the third screening step through which the rotary feed is processed.)

The Vulcan kilns, preheaters, and coolers, which comprise the bulk of the new calcining installation, were acquired from the former clinkered dolomite operation of Diamond Alkali in Ohio. Lined with refractory brick, the preheaters are 15½ ft. in diameter and 71 ft. high above the dust collection chamber. The latter were originally designed for spray systems, but were converted to incorporate rotating stainless steel scraper arms that scrape the dust into an auger.

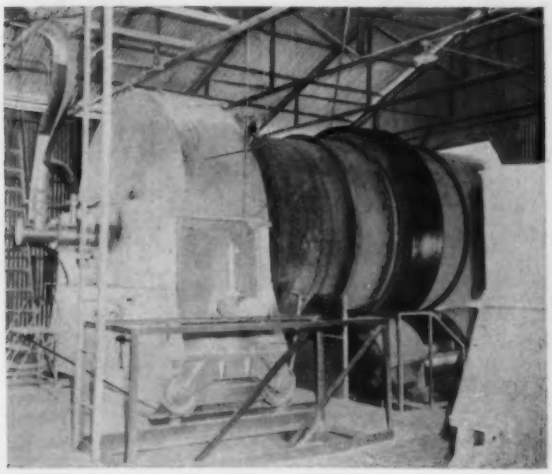
Kiln exhaust (exiting from the feed hood at 1,600 to 1,650 deg. F.) is drawn up through the preheater and then out through an external downcomer by a company-fabricated 20,600 c.f.m. i.d. fan. Gases enter the stack at about 400 deg. By the time the stone has passed through the preheater and entered the variable-speed kiln feed screw, its temperature has been raised to 1,400 deg.

The kilns are rotated by 40-hp. variable-speed drives through Falk reducers and they ride on three tires. They are lined with basic refractory for the first 66 ft. from the firing hood, then 70 percent alumina block to the last 30 ft., which is lined with Super Duty brick. Castable was placed in the taper section.

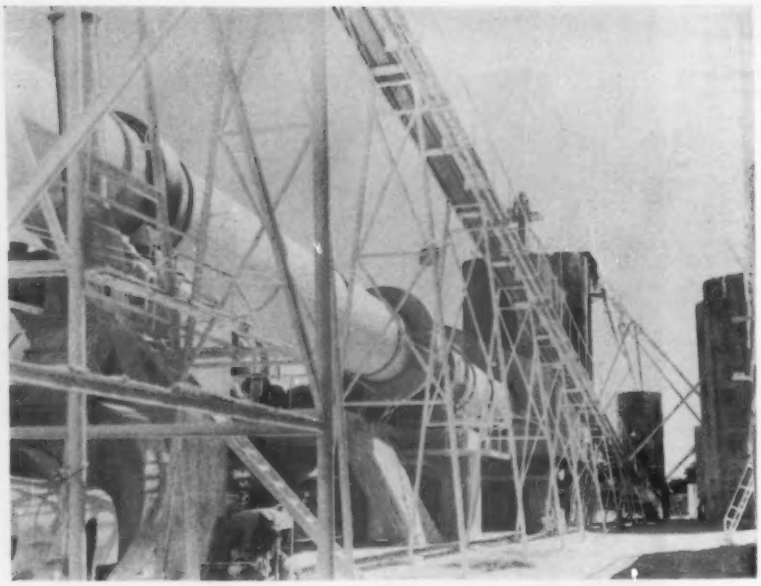
Natural gas averaging 1,050 B.t.u.'s is used for firing, and calcining temperatures approximate 2,500 deg. Primary air is delivered to the burner pipe by a 4,500-c.f.m. fan, and secondary air, originating from a 6,000-c.f.m. fan, enters from the cooler. Firing hood temperature is about 800 deg.

Fuel consumption is approximately 6,500 cu. ft. of gas per ton of lime. Combustibles in the kiln exhaust as determined by gas analyzers are well under 2 percent, and average 0.5. Oxygen content ranges from 3 to 4½ percent.

The kiln instrument and control panel on the firing floor incorporates all standard control systems, includ-



The firing hood of one of the two 8- by 150-ft. rotary kilns. These units are fired with natural gas, and the temperature of the stone entering via variable-speed feed screws has already been raised to 1,400 deg. F. in the preheaters.



The conveyor carries feed for the hydrate department from the storage tanks in the background.

ing dampers, stone feed screw, cooler pan conveyor, etc. Instrumentation includes Leeds & Northrup Micromax recorders; a Rayotube recorder; Bailey Meter hood draft and gas flow gauges; and a Daystrom Weston multiple-point recorder for temperatures in the preheater, feed end, firing zone, firing hood, stack, kiln shell, and cooler zones.

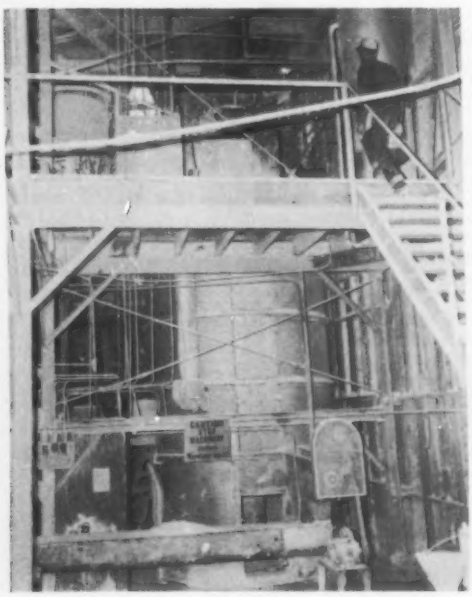
Pebble lime received onto the pan conveyors after passing through the five zones of the vertical coolers, has been cooled down to about 100 deg. In an emergency, the pan conveyors (at the rate controlled by tachometer) may discharge into a screw conveyor from which the lime is placed on a belt conveyor leading directly to the hydrate plant. Normally, however, the pan conveyors discharge into a bucket elevator supplying a pair of 120-ton capacity pebble lime storage tanks.

The latter are drawn upon for feed to a Williams 1512 hammermill. Products of this milling are raised in another bucket elevator to discharge through a chute system to other storage tanks. The chute system incorporates an internal grizzly on which coarser material may be separated, and subsequent routing will permit individual flow or blending to any desired amount. These products may be loaded from the storage tanks directly into rail cars or transferred to the hydrate plant feed belt.

In the shaft kiln operations, the 3 x 6 stone trucked from the crushing and screening plant is dumped into two hoppers—one supplying the newest and largest kiln, and the other the two older units. These hoppers feed cars on the individual skip hoist systems; and charging is done on 1½-hr. cycles for all three shafts.

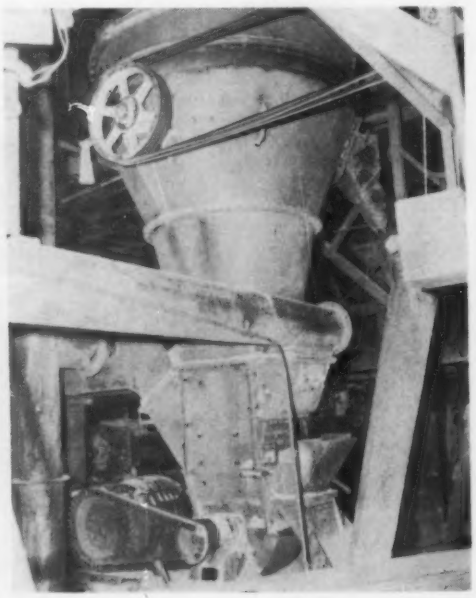
These kilns, all of which have been converted to natural gas firing, are equipped with multiport center burners. Calcining temperatures are between 2,100 and 2,400 deg., and the fuel consumption (averaging all three) is about 5,500 cu. ft. of gas per ton of lime. On the largest kiln, which is said to make excellent soft-burned lime, the retention time from feed to draw is 36 hours.

The draw cycle for all three shafts is the same as that in charging—1½ hours—and the product is delivered to a Syntron picking table for re-



Left: The newest and largest of the three hydrators. Hydrate is transferred via the screw, bottom, and bucket elevator to a storage bin ahead of four milling units.

At acquisition, there was only one mill in the hydrate department. There are now four. Milled products are transferred by screw conveyors to bulk loading and bagging supply bins.



moval of rejects before delivery to a Universal hammermill.

Discharge from the latter (minus $^{15}/_{16}$ in.) is transferred by a bucket elevator and screw conveyor system to various storage tanks. As with the rotary kiln lime, the shaft quicklime may be loaded directly from its storage into rail cars, or delivered to the hydrate plant feed conveyor.

The latter, a long, inclined unit seen in an accompanying photograph paralleling the rotary kiln installation, discharges into a surge hopper ahead of the three hydrators. Currently, only the newest and largest of these—a 16-t.p.h. Schaffer unit—is in operation. The two older 4-t.p.h. hydrators are maintained on stand-by. Feed to the larger hydrator is *via* Poidometer, and to the other two by weigh batcher.

Hydrated lime is discharged *via* screw to a bucket elevator and raised to a storage bin ahead of a battery of four size O Raymond mills with whizzer separators. Finished products from the separators are transferred by screw conveyor to various bins from which bulk loading and bagging may be supplied.

In another circuit, quicklime drawn from the surge hopper bypasses the hydration operation and is delivered through one of the dry stand-by hydrators to a mill. Ground quicklime is then put into a bin above a pair of 2-spout baggers.

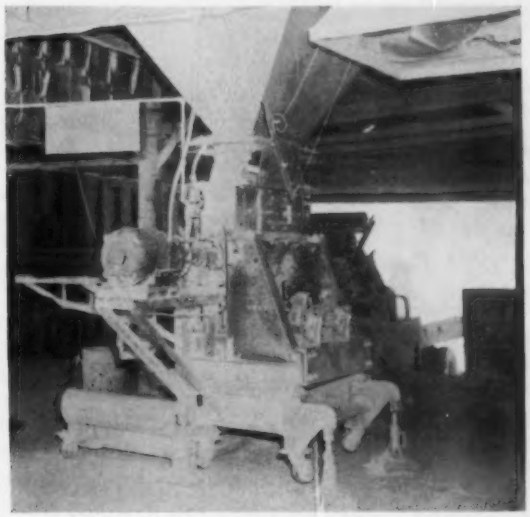
In the expansion of the hydrate department, a 500-ton bin with eight hopper sections was installed. A portable St. Regis 2-spout semiautomatic bagger is positioned below any desired hopper, and then jacked up a few inches to make connection. (See accompanying photo).

Another interesting operation designed by the superintendent, along with the above hopper setup, involves a bulk-loading system. This incorporates a pair of loading screws made up of 9-in. augers housed in sections of 9½-in. pipe. These are mounted on an angle in portable supporting framework, and the feed throat, as shown in an accompanying photo, may be connected to any hopper bottom on the large storage bin. The augers turn at 200 r.p.m. in bulk-loading of rail cars and also bulk transport trucks.

For three-shift operations of the two kiln departments and the hydrate plant, a crew of 59 men is employed. Of this number, 14 are assigned to the hydrate plant, 17 to the shaft kilns, and 9 to the rotary kiln operation. The quarry crew is comprised of 12 men. In addition, there is a 5-man maintenance crew. These operations are headed by C. S. Boyd, superintendent.

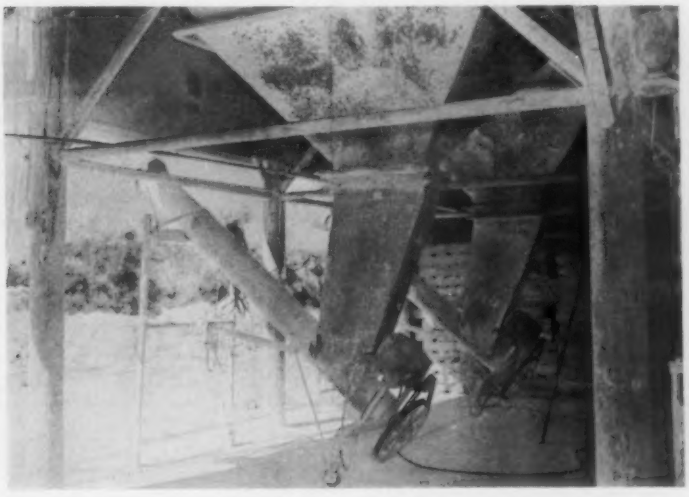
As silent reminders of the long history of this operation, the four old stone kilns remain standing. Built at various times since the original company was organized in 1867, they saw service ranging up to about 75 years, and were retired only little more than a decade ago.

Headed by Mr. Pickett, the present owners of Round Rock White Lime have raised the operation to a stature undreamed of by its founders. Admittedly learning much by trial and error early in the game management has come a long way—as proved by its progressive efforts—to establish a sound footing in the industry.



This portable bagging equipment can be spotted under any of several hopper discharge points. As seen here, it is then jacked up to make the connection.

These portable bulk-loading screws were fabricated of 9-in. diameter augers housed in lengths of 9½-in. pipe. They can be connected to various hoppers, as shown.



The Goldite Corporation reportedly will soon begin mining vermiculite on the site of old Silver City, Kans., in southeast Kansas. The operation will be a surface mining project with a 250-t.p.d. capacity.

• The author is a chemical engineer at West Virginia University and has had wide experience in the portland cement and industrial lime industries. He is a senior manufacturing engineer in the Manufacturing Process Department of the Portland Cement Association.

Pelletizing Characteristics of Raw Mixes

PART I

Synopsis

THE study of pellets made from raw mixes in drums or pans, as well as by natural pelletizing in wet-process kilns, is relatively new and only slightly explored in the American cement industry. In this report, laboratory tests of raw mixes from plants which use pellets either currently or experimentally are reported and analyzed.

The pelletizing of dry raw mixes is required for the use of grate-type kilns, and may also be practiced for preparing feed for straight kilns. Results vary with different raw mixes in regard to the degree of success in making satisfactory pellets.

Production of moist pellets is not difficult, as evidenced by test results on five raw mixes. However, after drying, pellets made from the different raw mixes vary widely in characteristics.

Pellets were tested for load-carrying capacity and abrasion resistance over a wide range of temperatures, with abrasion resistance appearing to be the most important test. Chemical additives improve pellets in some instances.

Mineralogical properties of the raw materials have a pronounced effect on pellet survival after drying. X-ray diffraction and differential thermal analysis were used in the study.

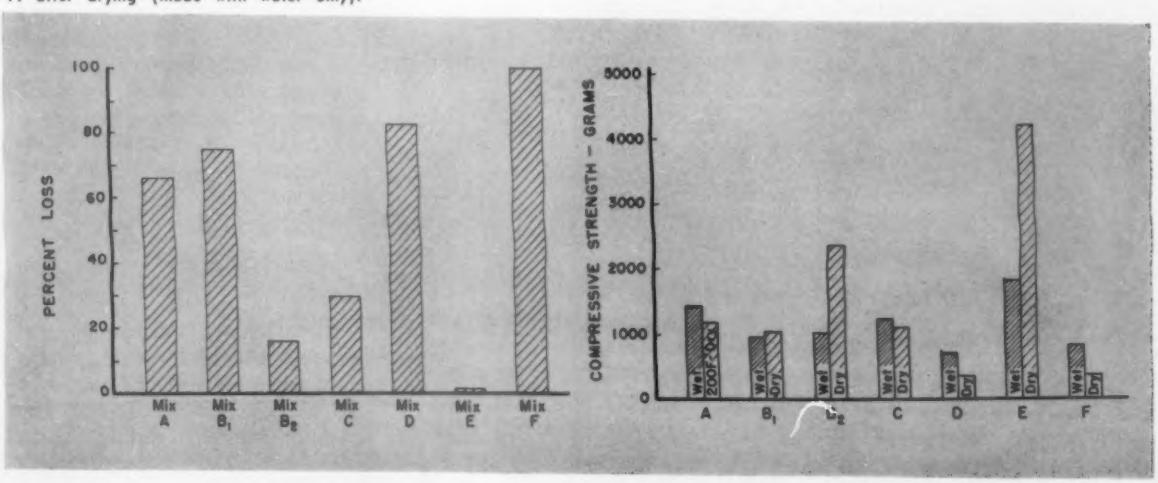
Introduction

Pelletizing is the process of forming small balls from raw mix with water at atmospheric or ambient plant temperatures in suitable devices of drum or disc type. Customary procedure is to feed dry raw mix and water together into the machine.

The criterion of pellet quality is its survival through drying and heating in a kiln, or on a grate. If it

Fig. 1—Abrasion loss of pellets at 200 deg. F. after drying (made with water only).

Fig. 2—Strength of pellets—wet and dry.



By J. RICHARD TONRY
Senior Manufacturing Engineer
Portland Cement Association

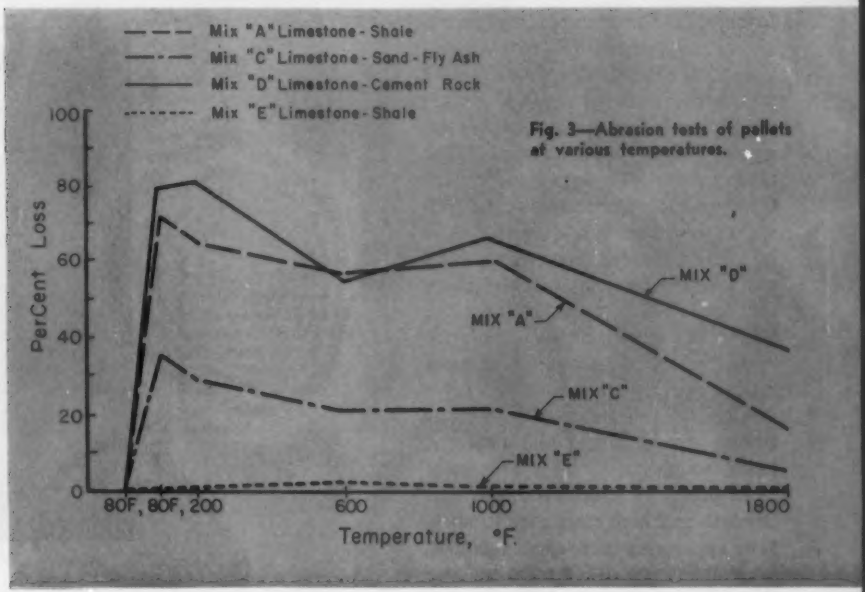


Fig. 3—Abrasion tests of pellets at various temperatures.

survives, little dust would be released and the objective in operation would be achieved. When a pellet breaks down, dust is liberated, with consequent increased dust loss for a conventional kiln or the more serious blanketing of the bed of pellets on a grate.

Satisfactory pelletizing properties of a raw mix are prerequisite for grate-type kilns. This is especially true of the properties of abrasion resistance and strength of pellets for grate-type kilns. Resistance to thermal shock seems to be of primary importance for pellet survival in straight kilns. In the one instance, pellets are exposed to gases at 500-600 deg. F. on a grate, while in a straight kiln the gases may be in the range of 1,000-1,800 deg. F.

Laboratory tests showed that five raw mixes could be made into pellets with comparative ease although their raw-material compositions were quite different. Since the objective was to learn how pellets react, no particular effort was made to study the operation of the small pelletizing machine beyond adjustments required to produce the material needed for testing.

The studies were made on the pelletizing characteristics of the raw mixes in the interest of feeding dry rotary kilns, and for their use on grates. Feeding of dry kilns in this manner has appeared attractive as a means of reducing dust losses; but the degree of success in existing installations seems to vary widely. This is due to the fact that some pellets survive thermal shock upon entering the kiln, and others disintegrate.

Chemical additives were tried with the raw mixes; but in general they failed to produce characteristics needed for survival in the 1,500-1,600 deg. F. range. Improved strength at lower temperatures was obtained in some cases.

The most significant comparison of the varied behavior of raw mixes in pellets is shown in Fig. 1. The range in abrasion loss goes from less than 1 to 100 percent. This test is made on pellets which have been dried, but not cooled. The abrasion loss on wet pellets is nearly the same for all of the raw mixes, being generally less than 1 percent.

Another important characteristic of pellets is strength, shown in Fig. 2. It is evident that pellets may become either stronger or weaker after drying. For example, raw mix F shows a reduction in strength after drying of about 50 percent. Raw mix E shows an increase in strength after drying of more than 50 percent.

Pellet Characteristics

The most important characteristics of good pellets are the following: (1) abrasion resistance, (2) resistance to thermal shock, and (3) load-carrying capacity or strength.

Abrasion Resistance Pellets must be sufficiently abrasion-resistant to survive in the kiln, while rolling in the load or sliding on the kiln lining. There are two ways in which pellets fail: (a) by wearing off the exterior as a fine powder; or (b) by breaking into pieces (¼ in. and under) small enough to pass through grate openings.

A test for evaluating pellets was improvised by building a small grate-type drum, which was rotated at a speed yielding nearly the same peripheral velocity as that of a 10-ft. diameter kiln (at 60 r.p.h.). The degree of abrasion resistance shown by a pellet is considered most valuable in indicating how pellets will perform in actual kiln operation.

Results of abrasion tests on heat-treated pellets from plant raw mixes A, C, D, and E are shown in Fig. 3. Raw mix E showed highly satisfactory performance in the grate-type kiln at Plant E, and high abrasion resistance in laboratory tests. Raw mixes A and D showed unsatisfactory performance when fed as pellets to straight kilns in the plants. Raw mix C showed fair performance as pellets when fed to a grate-type kiln. These actual plant results follow in a general way the pattern of laboratory tests shown on the chart.

Comparison of raw mixes at 200 deg. F. serves as an index of per-

formance. For example, raw mix E shows 0.9 percent loss in the abrasion test, whereas raw mix C shows 30.0 percent. Other results at higher temperatures are included to determine pellet characteristics. The temperature 200 deg. F. is chosen for comparison, because pellet failure at this point would mean failure in kiln operation, particularly on a grate. Dust particles would blanket the bed of pellets and restrict the flow of hot gases, so that subsequent improvement of pellets would be of little importance. Likewise, in a straight kiln, failure of pellets on drying would defeat the objective being sought.

In order to understand why low strength and high resistance to abrasion apparently can exist together, several characteristics must be considered, including the following:

1. Pellets showing low strength pulverize in failing or break into several pieces.

2. Pellets showing high abrasion resistance survive the abrasion test without serious breaking or disintegration.

3. Where the properties of low strength and high abrasion resistance existed in the same pellet, a plastic condition was observed which presumably prevented disintegration.

Resistance to Thermal Shock A pellet on a grate is subjected rapidly to an increase of temperature from about 80 to 500 or 600 deg. F. Upon entering a straight kiln, this temperature change may be in the range of from 80 deg. F. to between 1,000 and 1,800 deg. F. In order to survive, pellets must withstand internal pressure of steam to avoid "popping." "Popping" means a breaking apart of pellets, sometimes with a definite explosive action; it is an important factor in actual operation. It has been pointed out that pellets introduced into a straight kiln will alternately be exposed and buried in the load, thereby subjecting the pellets to a less severe temperature exposure than exists in a laboratory furnace in which simple pellets are tested.

In nearly all tests, pellets survive heat treating at 500-600 deg. F. Laboratory tests on plant-produced pellets also demonstrate this characteristic. Table I shows test results on Plant E pellets of four sizes, ⅜ in., ½ in., ¾ in. and 1 in., tested at three temperatures, 700, 800 and 900 F. Two pellets were placed in the furnace at the same time to note the time of first reaction on one and the condition after ten minutes exposure on the other.

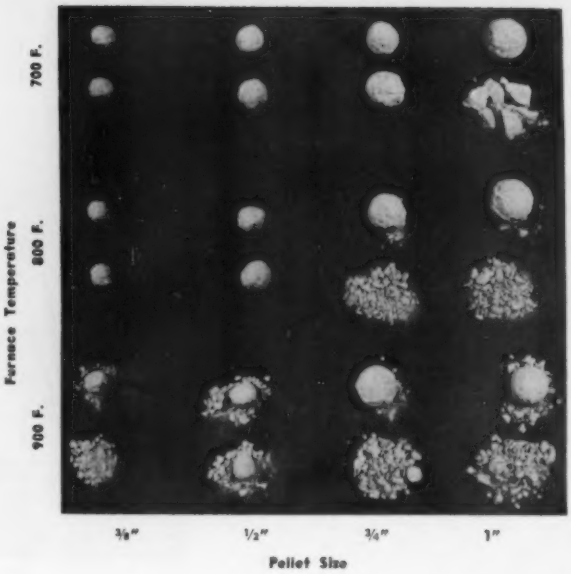


Fig. 4—Heat-treated pellets (plant E).

TABLE I—Pellet Popping Tests—Plant E

Furnace Temperature	Time of Initial Reaction and Time for Disintegration			
	⅜-in.	½-in.	¾-in.	1-in.
700 F.	N.R.*	N.R.	N.R.	N.R. 600 sec.
800 F.	N.R.	N.R.	144 sec. 264 sec.	150 sec. 285 sec.
900 F.	38 sec. 600 sec.	90 sec. 600 sec.	138 sec. 245 sec.	133 sec. 225 sec.

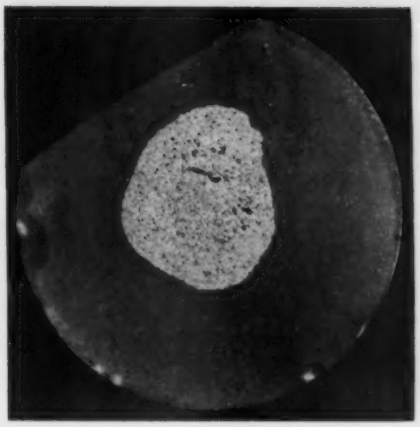
*No reaction

The temperature of the furnace was adjusted to the desired range before the moist pellets were placed inside. Time of reaction was noted for each.

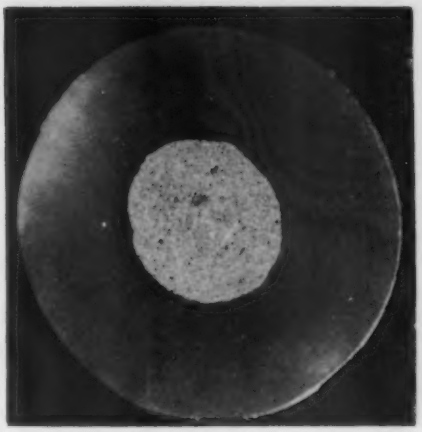
This test demonstrates that ⅜-in. and ½-in. pellets, made from limestone and shale at Plant E, survive heat shock at 700 deg. F. and 800 deg. F. Larger ¾-in. pellets failed by popping above 700 deg. F., and 1-in. pellets failed at each temperature of testing. Fig. 4 shows remains of pellets after heat treatment.

Results obtained on satisfactory pellets show about 30 percent porosity, as illustrated by Fig. 5. Unsatisfactory pellets (containing fly ash) are typified by Fig. 6 and show about 37 percent porosity. The visible difference between the two pellets lies in the amount of voids

Fig. 5 — Operating plant pellet of limestone and shale, halved, mounted in resin, and ground to smooth surface (pellet about ½-in. average diameter).



Left: Fig. 6—Operating plant pellet containing fly ash, halved, mounted in resin, and ground to smooth surface (pellet about 1/2-in. average diameter).



Right: Fig. 7—Pellet containing fly ash produced in pilot plant operation, halved, mounted in resin, and ground to a smooth surface (approximately 1/2-in. across).

present. Microscopic examination discloses that another characteristic —"permeability"—may be important. The fly ash pellets, although more porous, are less permeable, described as having "smaller physical discontinuity between particles."

Pellets made with additives were tested for thermal resistance by placing them in the laboratory furnace at various temperatures. This was done with wet pellets and with the furnace temperature adjusted before testing. When a pellet survived the temperature of the test, a fresh pellet and a higher temperature was then tried until "popping" or pellet breakdown took place. Results are shown in Table II.

Comparison of a pellet (Fig. 7) from the pilot operation on raw mix C, and a commercial pellet from the plant discloses some differences. The pellets were considered satisfactory and performed successfully in the pilot kiln, but plant-produced pellets were not successful in full-scale commercial operation. The differences apparent by visual and microscopic examination were as follows:

1. The pilot plant pellet was nearly perfect in shape, as compared to the irregular shape of commercial pellets.

2. The pilot plant pellet contained fewer voids, but was apparently less dense than commercial pellets. This characteristic of density is described by the petrographer as "having smaller physical discontinuity between particles," and could be termed "permeability."

Load-Carrying Capacity or Strength Pellets must be sufficiently strong to carry the load of other pellets in the feed hopper and on the grate. In order to obtain a comparison of pellets, a simple test was devised whereby a load was applied to the top of a pellet until it failed by crumbling or breaking apart. The device was assembled in the laboratory shops.

For evaluation of pellets on a practical basis, as in plant operation, this test is generally not considered to be of major importance. However, for the purpose of understanding how pellets perform, it provides useful information. For example, two raw mixes showing low strength also showed high loss in the test for abrasion resistance.

Strength of pellets is shown in Fig. 2 for seven raw mixes. Wet strength refers to fresh pellets from the pan, and dry strength refers to pellets dried at 212 deg. F. and immediately tested without cooling. Raw mix E shows the highest wet and dry strengths.

TABLE II—Effect of Additives on Pellet Popping Temperatures

Additives Used with Raw Mix B	Popping Temp. (F.)
Starch product	900
Redwood bark extract	650
Flocculant	1100
Calcium chloride	650
STP (sodium tripolyphosphate)—0.02%	600
STP—0.10% (explode)	700
Hydrochloric acid—0.10%	700
Waste sulfite product—0.10%	675
5% Clinker	900
Bentonite clay	700

Prolonged Rolling of Pellets

Laboratory tests indicated that a prolonged rolling of formed pellets was an aid to improving their performance. Results of tests on the raw mixes show three of them, A, C, and D, as responding to this treatment. For example, raw mix C showed about 30 percent increase in wet and dry strength, and about 30 percent lower loss by the abrasion test, after prolonged rolling.

As these raw mixes are non-plastic, the additional working or molding action afforded by prolonged rolling apparently brings the density of the pellets closer to an optimum percentage. Comparison of Figures 6 and 7 shows a difference in the amount of visible voids, as does a comparison of Figures 5 and 6. Considering that pellets shown in Fig. 5 were successful, density or "porosity" is an important characteristic. Also, pellets shown in Fig. 7 were of the same raw mix as Fig. 6, but they were produced under pilot plant conditions, and they proved successful in the pilot operation.

A further indication that additional rolling of the pellets resulted in improved characteristics is shown in Table III. These tests were made on fresh pellets and on pellets rolled for an additional 15 minutes in the pelletizer. Strength and abrasion resistance tests on pellets are shown wet and at 200 deg. F., with practically all the results showing improvement.

Prolonged rolling has been ac-

TABLE III—Effect of Prolonged Rolling on Pellets

Mix	Strength Load Capacity—Grams		Abrasion Resistance % Loss in Test		Additive
	Wet	200 F.	Wet	200 F.	
B_1	1336	1756	0.2	11.9	0.1 R. B. E.
B_1-Pr*	2357	2858	—	4.4	" "
B_1	938	1272	0.4	32.6	0.02 Flocculant
B_1-Pr	1069	1647	0.0	37.5	" "
B_1	1556	1212	0.6	76.5	0.02 $CaCl_2$
B_1-Pr	2365	1545	0.4	62.6	" "
B_1	1406	1065	0.4	46.8	0.1 $CaCl_2$
B_1-Pr	1682	1423	0.4	38.6	" "
C	1230	1106	0.0	30.0	Water only
C-Pr	1588	1433	0.0	21.0	" "

*Pr—Denotes prolonged rolling of pellets

complished on commercial pelletizers by the use of an extra rim or projection on the pan.

Pre-Wetting of Raw Mix

One raw mix (C) was moistened with water before being made into pellets. This was done in an attempt to offset or neutralize the presence of possible hygroscopic qualities due to the raw materials.

Water was added in a laboratory muller in such amount as to preserve the dry appearance of the mix. The water added was 2.6 percent; and the dampened mix was made into pellets in the pelletizer with the further addition of water (total added being near 14 percent).

The results of this pre-wetting were as follows:

1. Pellets of raw mix C were less dusty.
2. Strength and abrasion resistance were practically unchanged.
3. Water content of the finished pellets was about 1.5 percent higher.
4. Pellets formed more easily in the pelletizer.

Fineness of Raw Mixes

Table IV shows the fineness of samples used for making pellets. Plant raw mixes A, C, D, and E are kiln feed containing normal amounts (5 to 10 percent) of returned dust. Raw mix B_1 was prepared in the laboratory and does not show the particle distribution that would probably be produced in a plant grinding system; but since the materials are similar to those used in other raw mixes, it serves as a comparison in another fineness range.

• *The concluding section of this article will appear in the September issue of* PIT AND QUARRY.

TABLE IV—FINENESS OF RAW MIXES
Screen Tests

Raw Mix	Percent Passing Sieve No.						
	10	20	28	48	100	150	200
A	—	—	99.8	99.6	95.7	91.9	83.2
B_1*	100.0	99.6	99.2	97.9	80.8	71.5	63.1
C	—	—	100.0	99.9	98.8	97.0	93.0
D	100.0	99.9	99.9	99.5	95.4	91.3	88.0
E	—	—	—	99.9	98.3	94.6	88.6

*This is a laboratory grind. All others are kiln-fed raw mix from plants.

Particle Distribution of Raw Mixes*

Microns	A	C	D	E
+60	26.6%	14.3%	20.7%	14.9%
—60	73.4	85.7	79.3	85.1
—55	72.0	83.2	76.9	82.2
—50	68.2	81.0	73.6	80.4
—45	65.7	79.0	72.0	78.9
—40	62.0	76.0	69.5	73.8
—35	57.8	71.9	65.4	70.5
—30	52.6	67.5	63.2	67.3
—25	47.6	62.7	59.2	61.7
—20	41.5	55.8	53.9	56.2
—15	33.9	49.2	44.2	49.7
—10	25.6	39.0	29.1	40.5
— 5	14.2	25.1	12.2	27.2
Surface area $cm.^2/gm.$	2487	3957	2443	4140

*Determined by Wagner turbidimeter

Cement Sales Rising — Producers Now Optimistic

Sales of cement have shown improvement since the beginning of June. Some companies have reported that shipments are now equal to (or greater than) the corresponding period last year. The upturn is a welcome note following a first quarter volume below the corresponding 1959 period. (The decline was due to extremely unfavorable weather conditions.)

The New York *Journal of Commerce* reports that cement is getting its full share of the construction dollar, and is increasing its share of the market in competition with steel and other forms of construction.

If the recent upturn continues in the third and fourth quarters, construction is expected to equal last year's total despite the gloomy beginning of this year.

E. BERNARD MEYER has been appointed assistant chief engineer for United States Steel's Universal Atlas Cement Division, effective June 1.

Mr. Meyer's career with Universal Atlas spans a 21-year period, starting in 1939, when he was employed in the laboratory at the division's plant in Universal, Pa. He progressed through various ranks and in 1956 he was appointed project development engineer, a post in which he served until his present appointment.

United States Steel Corporation has opened a new slag products sales office in Chicago. GERALD M. LAKINS, who has been appointed Chicago district representative, slag sales, will be in charge of the new office. He was previously on the U.S. Steel Corporation's sales staff in Pittsburgh.

HOMER A. HUMPHREY has been appointed district engineer of the southern New England district of the Portland Cement Association. Headquarters will be in Boston. Mr. Humphrey succeeds MALCOLM S. LORING, who has resigned.

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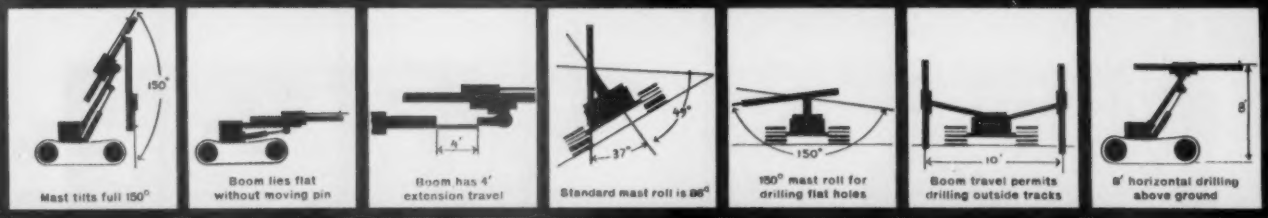

New Blue Brute 4½" Crawler Drill . . .

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Check out the all-new Blue Brute 4½-inch drill. It's built with the famous Worthington valve, the rugged rifle bar, heat-treated alloy-steel bushings at important wear points, and special analysis steel for *extra* strength. These and many other proven Worthington features mean least air consumption, less maintenance and downtime.

Look at the new Worthington mast! Five-inch channels and an all-welded assembly take full drill torque with strength to spare. And a more powerful feed motor shifts drill up and back more quickly for faster steel changes.

Look at the crawler carrier! An automatic line oiler is readily adjusted to lubricate drill, feed motor, hydraulic pump and tramming motors. The latter are 8 hp, giving a total drawbar pull of 6,000 pounds—enough to haul a 900′ compressor almost anywhere.

There's better operator safety, too! Carefully positioned boom and mast stops prevent over-balancing. And controls are placed for safer operation. But the basic stability of design permits the wide range of movements shown.

For more information about this new Blue Brute drill, call your Worthington rotary compressor distributor listed in the yellow pages. Or write Worthington Corporation, Dept. 60-29, Holyoke, Mass. In Canada: Worthington (Canada) Ltd., Brantford, Ontario.

WORTHINGTON

• Pertinent pointers on an important business procedure from an accountant who is also an authority on taxation

Budgeting your way to PROFITS*

By PAUL SAGE, C.P.A.

WHEN Victor Borge announced plans a few years ago for staging a one-man Broadway show, friends told him that he was as mad as another Dane named Hamlet. He would fold within a week, they said. But the talented musician-comic did not listen to the well-meaning criers of doom. Instead, he polished his act, engaged a theatre, and opened to rave reviews that helped the show to run for two profitable years in New York.

Millions of small businessmen think they can do what Victor Borge did—run a one-man show and make it pay. Some can, of course, but for every one who does, another sinks into a quagmire of debt and disappointment. Government statistics show that last year the death rate almost equaled the birth rate of small businesses in the United States, and the odds *against* success are increasing all the time—especially for the little fellow who insists upon flying into the competitive gale of the nation's economy by the seat of his pants. (The term "small business" in this article refers to companies with an annual sales volume of less than $5 million.)

*By permission of the American Institute of Public Accountants.

Some Popular Misconceptions Although no businessman, large or small, has to be told twice that profit margins are being squeezed in a wage-cost vise, most small businessmen tend to dismiss as "a lot of foolishness" the modern management techniques that could give them the tight control over their operations needed today for survival.

Take budgeting, for example. It is nothing more than hard-headed financial planning on an organized basis, and studies of thousands of sick, dying, and dead companies prove that a budget is an invaluable weapon in *any* manager's constant battle for operating economies and higher profits.

And yet, only about one-third of the small businessmen in the country use a budget. Why? Because of wide-spread misconceptions that budgeting is a complex process; that it increases accounting costs substantially; that it restricts management decisions; and that it is nothing more than a "guessing game" anyway.

Consideration of these misconceptions, one at a time, may prove profitable.

Budgeting is not a complex process. It is simply a sensible estimate of anticipated costs and expenses for a certain period. At the end of that period actual costs and expenses are tabulated and compared with budgeted amounts. That's all there is to it. The smaller the business, the simpler the budget.

By estimating, then comparing all elements of income, cost, and expense, a small businessman can see what it would take to improve performance; he can identify waste and inefficiencies, foresee working capital needs, and plan intelligently for growth. In short, he has control. He knows what he is doing and where he is going. And this is the case for any operator, no matter what his business may be.

Added expense—It is true that there is some added expense when a budget is installed. Help may be needed from a certified public ac-

Paul Sage conducts an independent accounting practice in New York and is a member of the accounting faculty of Adelphi College. He is an editor on the staff of the Journal of Taxation and contributes articles on accounting to The Journal of Accountancy. He is a member of the American Institute of Certified Public Accountants and the New York State Society of Certified Public Accountants.

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countant in drawing it up, and since budgeting cannot run ahead of the accounting system used, changes may have to be made in the accounts to provide more detailed data on which to base estimates.

Moreover, actual and budgeted amounts must be compared and deviations must be analyzed. All of this costs a little more, but experience shows that in the great majority of cases increased profits resulting from sound budgeting greatly exceed the slight added administrative costs. The budget that does not more than pay its own way is the exception and should probably be revised or discarded.

A business budget, unlike most governmental budgets, **does not have to be restrictive.** It should be a sound plan, and every management decision should be directed toward meeting the estimated figures; but a budget should not be allowed to hamstring operational and managerial flexibility. (This is the one advantage a smaller business usually has over its larger competitors.) The *profit objective,* not the budget, must remain king.

If an expenditure in excess of the budget will net a profit that otherwise might be missed, the expenditure is, of course, justified. An analysis of the deviation at the end of the budget period will explain why it was justified. This shows how budgeting provides a base for evaluating the probable results of decisions before they are made and the actual results after they are made.

A "guessing game"? To the extent that the actual results of the operation of a business are seldom exactly as budgeted, budgeting *is* something of a "guessing game." So why the bother of estimating? The blessing of a budget is that it *forces* planning. Plans must be made in detail. Management must take a critical look at what is being done; and this is constructive because even in the smallest business, operated under the sharp eye of "the boss," costly methods and habits frequently develop that may have been useful at one time but could now be eliminated.

Too, the fact that a budget is not being met raises questions as to why this is so, and what can be done about it. These queries arise during the budget period, before it is too late to call it anything but a bad year. Action can be taken in time to correct whatever might be wrong.

How to Begin As a rule, a simple budget is the best budget for small businessmen who have not learned the wonders of budgeting. Too much detail at first can be confusing, and may not even be needed. Start slowly. Excellent direction in the preparation of a trial budget is usually obtained when the familiarity of the company bookkeeper is pooled with the detached objectivity of an independent C.P.A. Without too much difficulty, these two should be able to outline a workable budget if given the necessary foundation: a sound sales forecast.

Making a Sales Forecast Sales comprise the key factor in budgeting. The sales budget must be a realistic estimate of what *will* be sold. Wishful thinking is fatal. Estimates should be based on past experience and planned changes, such as the addition of a new product, and then correlated with a "guesstimate" of business activity.

Several indexes usually published for local areas can prove valuable for this purpose: population trends, bank deposits, personal income and employment statistics. Note the trend in these bellwethers and use them as guides in formulating a sales forecast. Most customer-service enterprises, for example, would probably be unrealistic in budgeting an increase in sales if the population in a given area were dwindling and unemployment were increasing.

Next, production and inventories are forecast. On the basis of the sales forecast, will inventories have to be increased, decreased, or held at present levels? The answer will determine how much cash will have to be tied up in inventory, and so on.

The budget is built up from the bottom. Budgeted sales and production figures are fed to all persons responsible for a particular element of cost or expense. Each employee submits his own budget, and the individual budgets, whether there be 2, 20, or 50, are then integrated to form the overall budget.

Later, actual costs are classified and matched with the budgeted figures. Sharp differences are given thorough investigation. The entire process is repeated; and before long, management becomes accustomed to having accurate advance notice of substantially all costs.

The well-budgeted businessman has a much firmer grip on the wheel than his less fortunate competitor. Trying out a budget involves very little risk. Weighing the vast potential benefits against the comparatively meager cost of installation, a budget is a must for every intelligent businessman.

Marble Products Company, Atlanta, Ga., has purchased the assets and quarrying operations of Giudicy Products, Inc., St. Louis, Mo. Marble Products Co. operates several quarries in northwest Georgia near Whitestone. The firm produces agricultural limestone, white terazzo chips, and roofing granules. The Giudicy assets include four crushing plants and two quarries in Missouri.

Onoda Cement Company of Japan has developed a colored cement which reportedly will soon be produced on a commercial basis. Company spokesmen say the firm can produce seven distinctive and clear colored cements. These will be marketed in Japan and also exported.

CARROLL C. DACOSTA has taken the post of general sales manager of the Caribbean Cement Company, Ltd., of Kingston, Jamaica. He was formerly U. S. director of the Jamaica Industrial Development Corporation.

DAVID L. JOBE, 48, superintendent of the Grand River Limestone Company quarry near Allendale, Mo., died in May. He had been employed by the firm for nearly 14 years. He was interested in civic and community affairs and at one time was mayor of Tingley, Mo.

Enter 111 on card, page 145 ➔

"ReoMatics save 6½¢ per mile for Arizona Sand & Rock," reports Ralph Greer, Equipment Superintendent.

On a fleet-wide basis with each unit averaging 20,000 miles per year, Arizona Sand & Rock pares its operating costs by **6½¢ per mile through the use of automatics over straight sticks.** ASR's Reo dumps and mixers are equipped with **Reo Gold Comet Engines and ReoMatic transmissions.** Prime reason for ASR's standardization on automatics is to relieve costly shock load damage to drive lines and speed up delivery service to customers.

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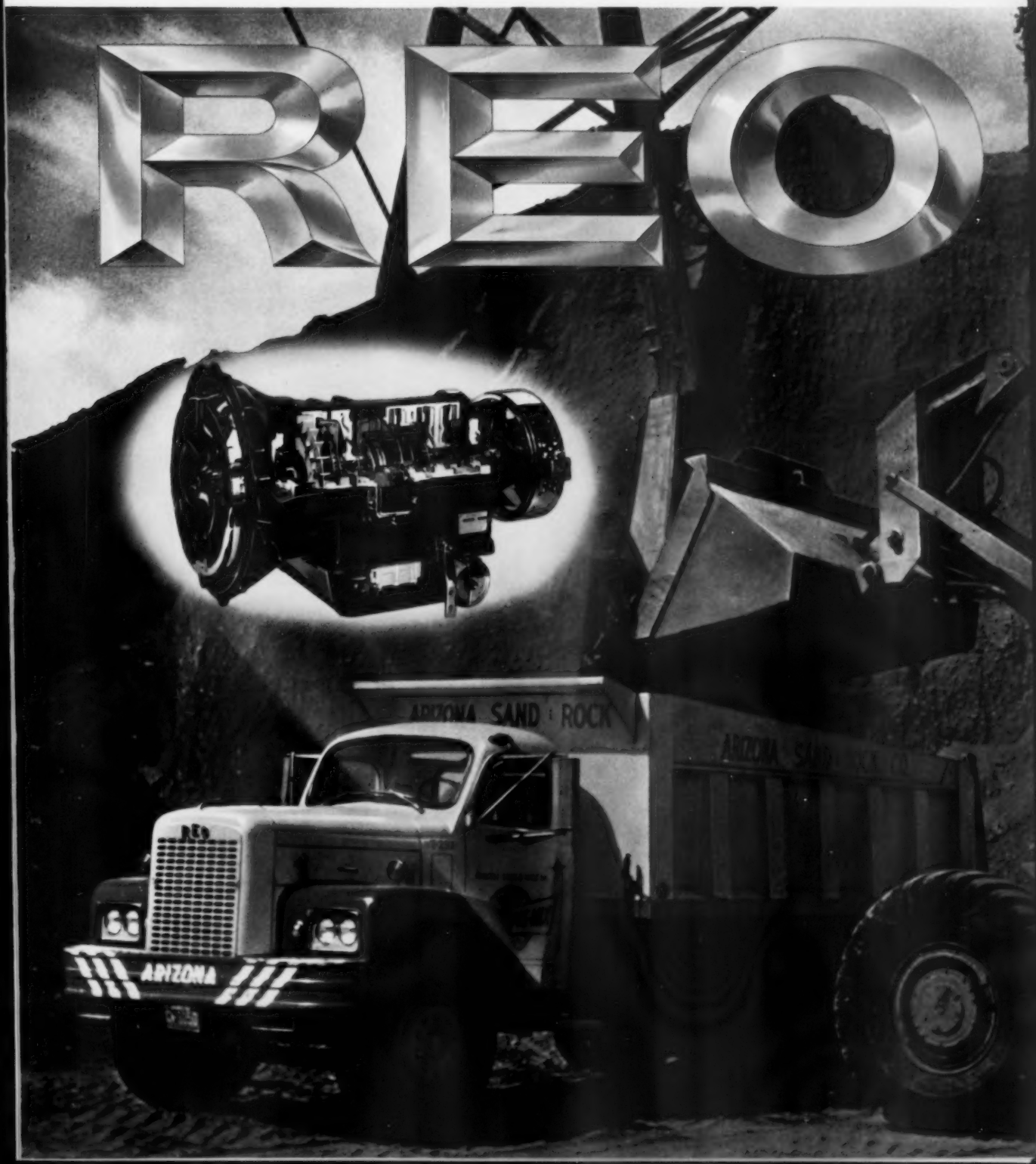

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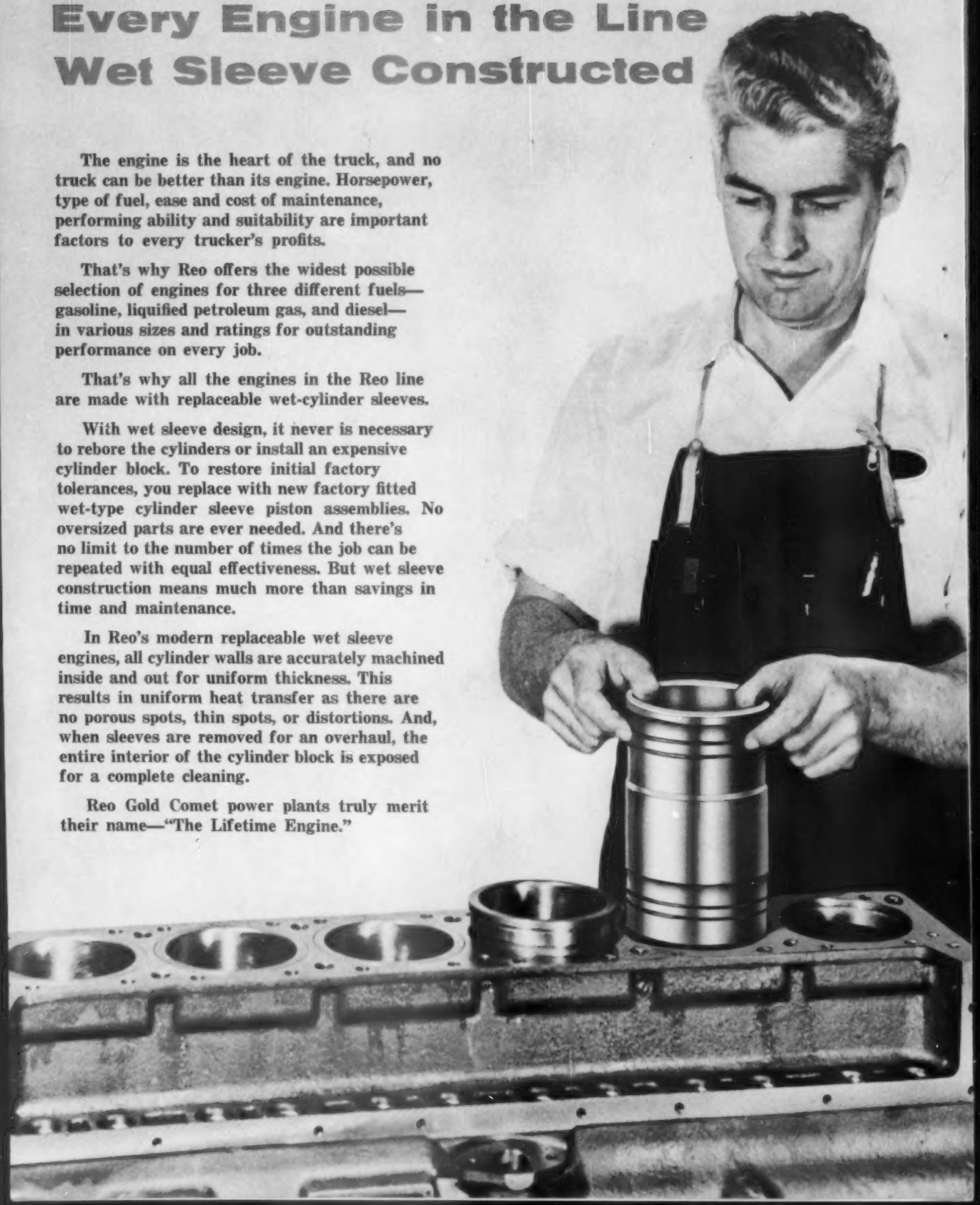
That's why Reo offers the widest possible selection of engines for three different fuels—gasoline, liquified petroleum gas, and diesel—in various sizes and ratings for outstanding performance on every job.

That's why all the engines in the Reo line are made with replaceable wet-cylinder sleeves.

With wet sleeve design, it never is necessary to rebore the cylinders or install an expensive cylinder block. To restore initial factory tolerances, you replace with new factory fitted wet-type cylinder sleeve piston assemblies. No oversized parts are ever needed. And there's no limit to the number of times the job can be repeated with equal effectiveness. But wet sleeve construction means much more than savings in time and maintenance.

In Reo's modern replaceable wet sleeve engines, all cylinder walls are accurately machined inside and out for uniform thickness. This results in uniform heat transfer as there are no porous spots, thin spots, or distortions. And, when sleeves are removed for an overhaul, the entire interior of the cylinder block is exposed for a complete cleaning.

Reo Gold Comet power plants truly merit their name—"The Lifetime Engine."



Small Pennsylvania Plant Makes:

- glass and refractories stone
- concrete stone and sand
- masons' sand
- furnace liner

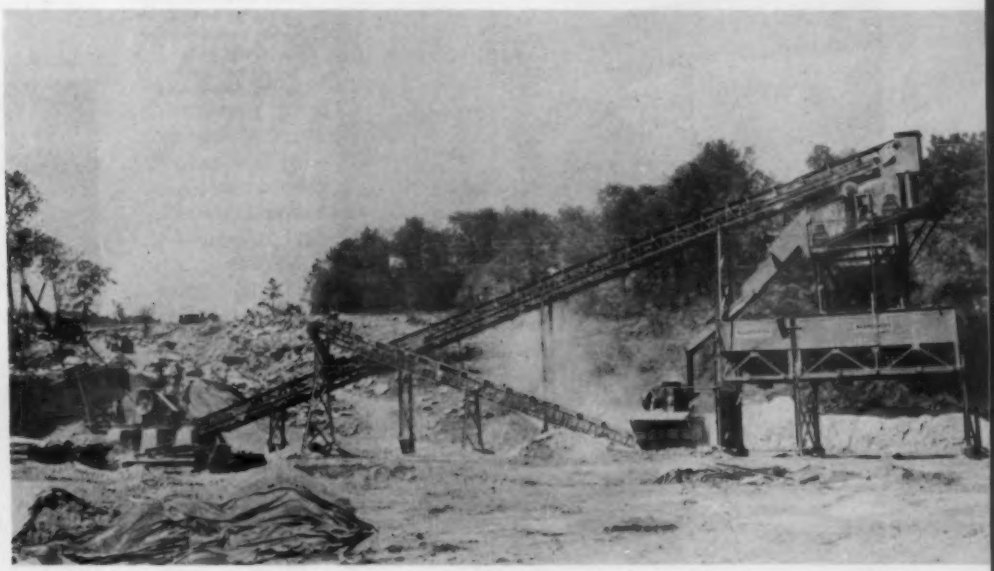
IT IS NOT unusual for a sand and gravel company to be in the crushed stone business or *vice versa,* but it is notable when a company operates only one plant which produces crushed stone—sandstone. Robert F. Minahan, sole owner of Minahan Sand & Gravel Company, explains this by pointing out that the deposit is a very hard silica sandstone which is suitable for glass and refractories manufacture, as well as for aggregates and concrete and masons' sands. This modern and compact new plant has a capacity of 50 t.p.h. when it is producing the normal range of sizes. The location, at Boswell, Pa., 20 miles southwest of Johnstown, is in the center of a good market for all of these products, in an area including three large counties.

By WALTER E. TRAUFFER

Mr. Minahan was in the trucking business for many years and, among other things, delivered aggregates for a refractories manufacturer. The good prospects for this product and for construction aggregates in this area got him interested enough to look over the available deposits. He checked up on geological reports and on other information available. Real estate companies and other land owners hold known deposits to lease, rather than sell; and after checking the available deposits carefully, he chose this one. It is on a 125-acre tract leased from the Eldora Land Corporation, and is in the Kittanning sandstone.

The deposit is in the shape of a flat-topped dome lying above ground level and is described as a four-way anticline. Overburden averages only 4 ft. The face was developed into the north wall of the dome. An outcrop of this stone and some clay had to be disposed of to get at the main 30-ft. vein; and much of this was made into an acceptable product by double processing it through the plant. The quarry floor is about 50 ft. above the plant ground level and has a 3 percent slope, which gives good drainage.

The quarry is at present being worked in two 12- to 15-ft. benches. Three-inch blast holes are being drilled on 4- by 4-ft. and 6- by 6-ft.



In this general view of the Minahan sand and gravel plant, the quarry and primary crusher are at the left. The screen and the reduction crusher are at the right.

The hopper and apron feeder discharging over a grizzly to the 20- by 36-in. primary jaw crusher.

patterns on these levels by a wagon drill. Later, when there will be a 30-ft. single face, one of these patterns will be used. Kennametal bits with carbide inserts are averaging 25 ft. of hole per hour. Bit life is 40 to 60 ft. per dressing for 4 or 5 dressings. Air is supplied by a Gardner-Denver 315 compressor. Both Atlas 75 percent gelatin and ammonium nitrate are used. A stick of dynamite and cap are used in the bottom of the hole, followed by 5 ft. of ammonium nitrate, a half stick of gelatin, more ammonium nitrate, and 4 to 7 ft. of tamping. Shots average 20 holes in three or four rows.

Loading is done with a Lorain L-41 diesel shovel with a ¾-cu. yd. rock dipper. Two G.M.C. 10-ton dump trucks haul downhill to the fill, from which they discharge to the plant hopper. At the time the plant was visited, the shovel had developed engine trouble, and a Pettibone-Mulliken 250 Speedall front-end loader with a 3-cu. yd. bucket was pinch-hitting, picking up a load of stone and carrying it to the hopper.

The hopper and apron feeder discharge the stone at an even rate over a grizzly into the 20- by 36-in., Pioneer primary jaw crusher. This unit is driven by a 60-hp., 440-v. motor through V-belts. The 5-in. minus product is discharged on the 24-in. by 115-ft. main belt conveyor

The 3-cu. yd. front-end loader discharging stone to the primary crusher.

Left: The three-deck sizing screen is located over the truck-loading bins. The reduction crusher is in the foreground.

Right: Robert F. Minahan is owner of the plant, and his daughter, Dolores Jean, is the office manager.

to a screen over the truck-loading bins.

The 4- by 12-ft., 3-deck Aggregates Equipment, Inc., screen is usually equipped with 1½-in., ¾- or ⅜-in., and ¼-in. or ⅛-in. wire cloth on these decks. The 1½- to 5-in. oversize goes through a stepped chute to a 36-in. Stedman single-cage impact-type reduction crusher. This unit was originally driven at 1,100 r.p.m., but was slowed to 650 r.p.m., in order to correct a fines condition in the sand. Only the drive pulley was changed; the same 50-hp. motor is used. An 18-in. by 30-ft. belt conveyor returns this material to the main conveyor and screen.

The three sizes of material produced are discharged into three 30-ton Aggregates steel truck-loading bins. Three sizes are made at one time, and two more can be made by changing the second and third screen decks. The three coarse sizes are 1½-in. or No. 2B, No. 2, and No. 1B. Concrete or masons' sands can be made through the bottom deck. Trucks are used for stockpiling; and reclaiming for shipment is the chief function of the front-end loader previously mentioned.

The entire plant is operated and controlled by one man from a central panel at the primary crusher. Dust control consists of sprays at the primary and reduction crushers. This entire plant was supplied by Aggregates Equipment Inc., Eldora, Pa.

In a valley near the plant there is an unconsolidated deposit of sand mixed with loam which will probably be worked for various purposes. It can be sold direct from the pit without processing as liner sand for open-hearth steel furnaces, according to Mr. Minahan. This material may also be trucked to the plant hopper, where 20 percent of masons' sand can be added. This material would then go through the plant flow to make ⅛-in. minus runner sand to line runners in blast furnaces. The material over ⅛ in. would be a salable pea gravel.

N.L.I. Midyear Session

(*Concluded from page* 95)

committees based on an extensive N.L.I. survey of several thousand farmers. The growing effects of inflation should spur efforts toward the goal of increasing A.C.P. appropriations to $500 million, it was reported.

The committee also recommended renewed effort toward removal of the mandatory soil test provision, and continuation and expansion of the association's effective work in public relations.

H. C. Wolfe (Wyandot Dolomite, Inc., Carey, Ohio), chairman, reported for the C.L.D. legislative, public relations, and tax committee. This group recommended the following points: support of a change in the ratio of federal-state matching funds from 50-50 to 75-25; strong opposition to any stretchout of the highway program and to any diversion of highway funds; and support of an annual $1 billion appropriation for ABC highways.

Continuing N.L.I. effort to support retention of percentage depletion, and the development of a new system of reinvestment depreciation was also endorsed by the committee.

R. B. McNab (American Limestone Company, Knoxville, Tenn.), a regional vice-president, and chairman of the A.L.D. membership committee, cited the work of the N.L.I. staff in the field which has resulted in a net gain of 14 new members. Roy E. Mayes (Carthage Marble Corp., Carthage, Mo.), chairman of the C.L.D. committee, reported that membership in this division has grown by 42. Total N.L.I. membership is now over 500.

Recommendations of the A.L.D. promotion and education committee were presented by the chairman, George A. Ziegler (M. J. Grove Lime Co., Lime Kiln, Md.). Both Messrs. McNab and Ziegler advocated continuance of overall N.L.I. practices, and development of news releases featuring division policies. It was suggested that members should forward data and photographs on aglime spreading to the Washington office for use in future promotion pieces. Increased emphasis on the use of liming materials, in publicity, was also urged.

The C.L.D. committee report, delivered by John H. Riddle (Riddle Quarries, Inc., Salina, Kans.) recommended a free news release service to highway departments, an effort directed toward standardization of state specifications, and a parallel effort toward standardization of specifications on the interstate highway system.

Both the state association and the regional committees commended the staff for contacts made with U.S.-D.A. and state groups throughout the country. These contacts have been fruitful in spreading understanding of N.L.I. objectives, and, as noted by Charles S. Bryan (Bryan Aggregates, Inc., Minneapolis, Minn.), the support being given the national group by the state associations encourages further liaison.

In his report to the joint boards, Robert M. Koch, N.L.I. president, stated that public relations efforts at the county level have been and will continue to be highly effective. There have been regular information contacts with approximately 3,000 county offices.

With a well-established staff, the Washington office is now making more contacts on Capitol Hill, and is intensifying membership drive efforts. More and closer contacts with agricultural colleges are planned.

With respect to long-range policies and plans, Mr. Koch noted that the time is now ripe for a major campaign aimed at the $500 million A.C.P. program originally considered by Congress. This should involve a mailing list directed at key people on the "grass roots" level. Liaison with F.A.R.M., N.A.S.C.O., and other agricultural groups would further this campaign.

While there is currently little activity in the area of percentage depletion, it is Mr. Koch's opinion that the Congress will probably tighten up on this tax credit. N.L.I. policy concerning the highway program continues as established, it was stated.

ROBERT T. BOGGS and WILLIAM ZIMMERMAN have been named as sales representatives in the Columbus, Ohio, area for the Columbia Cement Corporation.

Missouri Firm Records Steady Growth

Latest move involves converting waste gravel fraction into marketable sand

By BUREN C. HEROD

Above: In the dredging operation, the entire bank above river level is pulled —no stripping is required. This dredge can fill a 300-ton barge in 20 minutes.

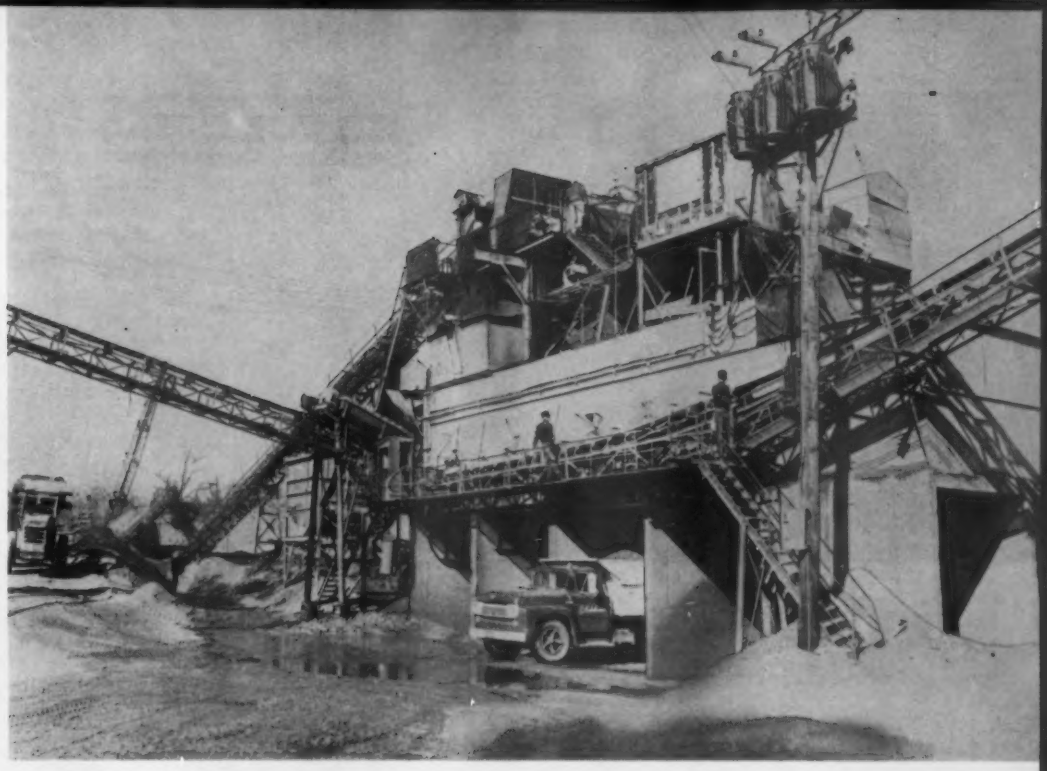
Left: Feed for the plant is transferred from barges to surge or hopper by a clamshell crane.

ANOTHER ON THE SPOT report

IN LESS than 10 years the productive capacity of Winter Bros. Material Company, Fenton, Mo., has been more than doubled —from approximately 1,500 t.p.d. to nearly 4,000 t.p.d.—in a dredging, screening, washing, and crushing production flow of sand and gravel. Coupled with the fact that the company was founded less than 15 years ago by two brothers, George Jr. and Robert Winter, who had never been in the business until that time, the above figures even more significantly illustrate the progressiveness of two of the youngest members of the industry.

The expansion was not a concentrated one-shot project, but made up of a number of successive improvements undertaken as the young organization continued to prosper. The latest, involving a crushing installation for conversion of an excess of torpedo gravel to a more marketable product, was incorporated just over a year ago.

Indications of the potential (now realized) success of Winter Bros. can be found in the careful planning preceding the firm's organization. A study of markets, available



The main processing installation in the Winter Bros. operation. Its 4,000-t.p.d. capacity signifies this organization's impressive growth from its modest origin.

material, and transport confirmed the feasibility of opening an operation at Fenton. Here, several hundred acres on the north and south sides of the Meramec River contained a large quantity of readily recoverable material; the tract was only eight miles from the vigorous construction areas of metropolitan St. Louis; and the latter could be served entirely by economical, relatively short truck hauls.

The basic market supplied is ready mixed concrete; others include material dealers, road maintenance, and now, with the addition of crushing equipment, bituminous mixing operations.

When it started out in 1946, the company had a small screening plant supplied by a drag scraper. This was followed by wet-pit dragline operations along the river, with haulage to the plant *via* belly-dump trucks. In 1954, the principal phases of the present operation, designed by the Winter brothers, were erected, and excavation was converted entirely to dredging. The latter also involved acquisition of several barges, and a towboat. Further increase in the overall operation was represented by the acquisition of a neighboring sand and gravel plant, and its supply dredge, now operated as Jefferson County Materials Company.

No stripping is required ahead of dredging operations. The recoverable material is about 45 ft. deep, and the entire bank above river level is pulled. On the larger of the two barge-mounted dredges is a 16x18 Thomas pump driven by a D397 Caterpillar diesel engine. The smaller dredge, primarily a stand-by unit, has a 12-in. pump.

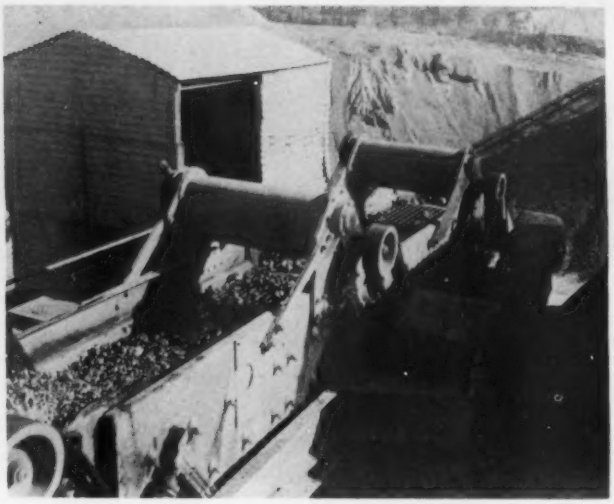
In normal operations, the larger dredge can fill a 300-ton capacity barge in approximately 20 minutes with material ranging from 2½-in. to sand size. These barges, as seen in an accompanying photograph, are pushed to the dredges, spotted where needed, and returned to the dock for either plant, by a pair of towboats. Due to the fact that the large dredge pump was revved up to 333 r.p.m., the number of barges —25 to 30—that can now be filled on two dredging shifts is larger than was formerly possible on three shifts with a lower pump speed.

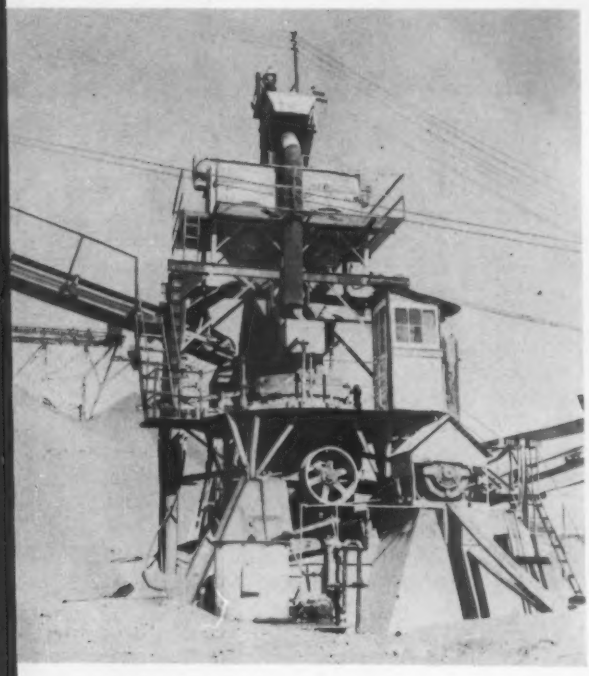
At the Winter plant site, loaded barges are moored to the bank,

One of the two towboats which, on two dredging shifts, convey 25 to 30 barges from plant to dredge and back.

Left: Transfer of material from one area of the surge to another for drainage, or for delivery to the feed hopper, is handled by this equipment.

Below: Screening operations in the main plant involve these units, and five others which are mounted above a set of loadout bins.





Above. left: A closeup of the crushing installation with which material—previously surplus and waste—has been converted to a marketable product. At the top are two V-screens which remove fines from feed to crusher.

Above, right: Stockpiling of round, washed gravel is done from the 500-ft. long tripper conveyor installation (background). Materials are drawn from side gates in the screening plant bins. Sands are stockpiled from separate systems.

Left: Lateral reclaiming and truck-loading conveyors are installed below the stockpiles. Torpedo gravel (being discharged from the tripper) is reclaimed on the belt in the foreground for transfer to the new crushing facilities.

where a 3-cu. yd. Lima 1201 clamshell crane is stationed for unloading. The crane dumps onto a surge pile of river-run material, or directly into the plant feed hopper as desired. (There is a similar installation at the Jefferson County plant site.)

In addition to providing a surge, the pile allows for drainage of the feed before it is discharged onto the main conveyor belt. A Model C Le Tourneau-Westinghouse Tournatractor is used on the surge to transfer material from one area to another in blending for control of moisture content. This unit may push the corrected feed directly onto the tunnel, or to an area where it may be rehandled by the clamshell, if necessary. The surge is maintained at a capacity that will permit plant operations for a full week in the event of dredge shutdown.

Plant feed is drawn from the tunnel *via* a series of gates, and is received on a 24-in. inclined belt conveyor for transfer to the screening and washing plant. This installation is comprised of seven double-deck Cedarapids screens, two company fabricated 10-ft. sand dewatering wheels, and a sand screw mounted above a concrete and steel bin structure. Drive-throughs are provided for direct truck loading below the bins.

As discharged from the feed belt, the flow is initially split to a pair of 4- by 12-ft. screens as the first step in parallel fine and coarse material processing lines. These screens are mounted side-by-side at the top of the plant, and are supplied with wash water from a common header between the two (see photo). The "fine" screen makes a $\frac{5}{16}$-in. split on the top deck, and $\frac{5}{32}$-in. on the bottom. An identical top deck is used on the "coarse" screen, but the bottom deck is split between $\frac{3}{16}$-, and $\frac{1}{8}$-in. screencloth.

Throughs from the former screen flow to one of the dewatering wheels, which discharges to a 20-in. stationary stacker conveyor. The flow from the bottom deck of the other screen (minus $\frac{3}{16}$-in.) may be split between a Wemco sand screw and the second dewatering wheel, or it may be delivered in total to either of these units. This dewatering wheel discharges to a 24-in. stationary stacker conveyor, and the sand screw to an 18-in. stockpiling belt.

Material retained on the top deck of each of the first screens is delivered to a following split-decked unit on which ½ x $\frac{5}{16}$, 1 x 1⅝, 1⅞ x 2, plus 2-in., minus $\frac{5}{16}$ minus 1-, and minus 1⅞-in. fractions are separated and discharged into underlying bin compartments.

The gravel retained on the lower decks of the two leading screens is fed to a torpedo gravel screen on which plus ¼- and plus $\frac{3}{16}$-in. fractions are removed, and from which the minus $\frac{3}{16}$-in. throughs are routed to join the flow to the fine sand wheel and/or screw.

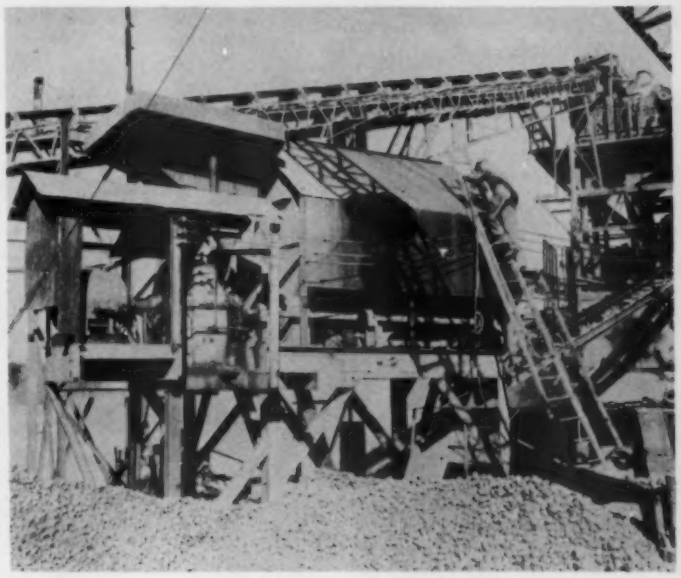
All wash water from the screening stage (supplied at 2,000 g.p.m.) flows to a tank from which it is transferred by a 6 x 8 Allis-Chalmers rubber-lined pump to either of a pair of 24-in. Whirlcones. The latter are utilized in control of fines in the sand stockpiles.

In stockpiling the larger gravel fractions, these are individually drawn through side gates on their respective bins sections onto a 20-in. belt conveyor. This unit transfers the finished products to a tripper conveyor installed on a 500-ft. long framework above the stockpiles. Under each product pile is a lateral corrugated steel tunnel housing a reclaiming and truck-loading conveyor.

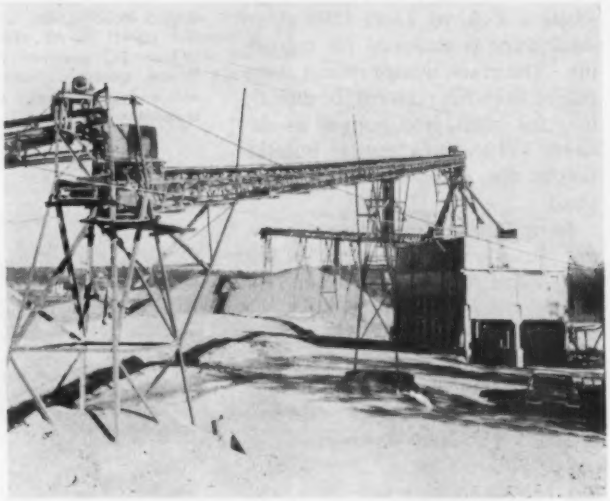
At its extreme end, the tripper

Right: Heading the operation are (l. to r.): George Winter Jr., president; Bob Winter, general superintendent; and "Red" Klahs, plant superintendent.

Below: This scrubber handles feed to the Jefferson County plant, plus all 2-in. material trucked from the other operation.



Stockpiling and loadout facilities at the Jefferson County plant are similar to those at the newer Winter Bros. location, but on a smaller scale.



discharges onto the stockpile of torpedo gravel—a fraction that represents about 10 percent of dredge-run plant feed. Torpedo gravel had formerly posed a problem, due to the excess quantities recovered above salable amounts and due to the ever larger area required to store this excess. With the decision to add crushing facilities to convert this gravel into manufactured sand, the Winters not only solved the space problem, but improved their position in the active market for sand sizes.

The crushing installation consists of a 200-hp., 54-in. Nordberg Gyradisc crusher and a pair of Symons V-screens, which are fed from the torpedo gravel stockpile at 100 to 125 t.p.h. *via* a 20-in. belt conveyor. Two primary functions served by the screens are the removal of fines from the feed to minimize wear on the crusher, and dewatering of the feed to a workable moisture content (about 2½ percent).

One of the screens is fitted with ⅛-in. opening screencloth, and the other has $^{3}/_{16}$-in. openings. Material passing is conveyed to separate ground piles, that retained being delivered to the Gyradisc. The crusher drive is ammeter-controlled, since the load varies with moisture content.

Manufactured sand produced with the above installation may be loaded directly into trucks or conveyed back to a 3- by 8-ft. double-deck scalping screen, elevated above the primary screening plant. Here uncrushed oversize material is removed and recirculated, and minus 3/16-in. sizes are blended with the natural sands *via* the dewatering wheels and/or screws.

In addition to direct truck loading from the washing plant bins, and from the stockpile conveyors, finished products are also rehandled by Michigan loaders, a Hough Payloader, or a series of clamshell cranes. All haulage is done under contract, with shipments weighed out over a Howe scale.

All plus 2-in. material separated from the flow in the washing-and-screening plant is hauled to the nearby Jefferson County Materials operation. Here it joins the comparable fraction from the feed to that plant and is processed through an 84-in. Telsmith Super scrubber. Other processing equipment at this location include a pair of 4- by 12-ft. Simplicity screens and a 3- by 8-ft. unit on a washing-and-screening tower. Loadout and stocckpiling facilities are similar to those on the Winter site, but on a smaller scale.

Overall operations are headed by George and Bob Winter, and "Red" Klahs, superintendent. A crew of 43 men are employed at the larger installation, and 17 men at the smaller.

Union Rock's Newest Plant Features One-Man Control

The completion of a new aggregate plant at Mesa, Ariz., has increased the production of Union Rock & Materials Company to more than 1,600 t.p.h. This is the fourth plant built for Union Rock & Materials. The firm operates another aggregates plant, and two concrete producing plants.

The new facility, which includes a bituminous concrete setup, is laid out in a straight line, eliminating the usual maze of crisscrossing conveyors. This arrangement permits one-man control of material movement.

The plant was engineered by Kenneth Bentson (the owner), Guy Clark, company engineer, and Phil Williams, maintenance engineer. Bill Hale, former truck superintendent of the firm, has been named superintendent of the Mesa operation.

Gypsum Mine Output Down 8% During 1960 First Quarter

During the first quarter of 1960 domestic mine output of crude gypsum totaled 2,145,269 short tons—8 percent below the tonnage reported to the U. S. Bureau of Mines for the corresponding period of 1959. Calcined gypsum increased slightly, whereas imports increased 38 percent during the same quarter.

Sales of uncalcined gypsum products declined 7 percent from the first quarter of last year; portland cement retarder sales showed the greatest decrease. Industrial plasters increased 8 percent. Building plasters, in over-all uses, were down 5%.

Gains were recorded in all categories of industrial plasters, whereas declines were reported for base-coat, gauging and molding, prepared finishes, and Keene's cement plasters.

Sales of gypsum board products totaled 1,800,000,000 sq. ft.—down 5 percent from the first quarter of 1959.

Pipe Creek Stone Company, Swayzee, Ind., provided 140 tons of crushed stone, 15 trucks, and nine extra drivers—entirely free of charge—to launch and complete a community good will gesture called "Operation Stone." The project consisted of graveling three-quarters of a mile of road at Camp Crossland, the Kokomo (Ind.) Boy Scout camp. The camp will now be operative in the winter months for camping.

Production and Value of Sand and Gravel in 1959

By KENNETH E. TOBIN JR.
Associate Managing Director
National Sand and Gravel Association

THE National Sand and Gravel Association has completed its seventh annual survey of the production and value of sand and gravel. This survey is designed to fill the need for a current measurement of the contribution which the sand and gravel industry makes to the national economy.

Questionnaires were sent to the 2,120 sand and gravel companies in the United States and Canada of whom we have record. Returns were received from 816 companies, operating 1,282 plants. Limited data were also available on 55 member companies, operating 82 plants, which did not return the questionnaire. These latter statistics have been incorporated in the study wherever possible, making a total participation of 871 companies, operating 1,364 plants, or 41 percent of the total companies surveyed. We believe the reporting companies produced a majority of the total commercial sand and gravel tonnage in 1959.

Herewith are four tables which reflect the results of the survey. Table 1 shows that the reporting companies produced 289,323,746 tons of sand and gravel, valued at $337,753,085, an average value of $1.17 per ton. The results of our 1957 and 1958 surveys are also included in Table 1. Our 1959 survey reveals that sand and gravel production increased last year, as compared with production in 1958 of 267,808,002 tons, by 21,515,744 tons, or approximately 8 percent.

The increase in 1959 production, when compared with 1958, is reflected in total values. Last year the value of sand and gravel, as compared with 1958, increased from $302,918,129 to $337,753,085, or approximately 12 percent. The average value per ton of sand and gravel increased from $1.13 to $1.17, or approximately 4 percent.

The average production of the reporting companies and the average production per plant increased in 1959. The average production per company in 1959 was 332,174 tons, compared with an average production per company of 317,308 tons in 1958, an increase of 14,866 tons per company, or 5 percent. Similarly, average production per plant increased from 194,487 tons in 1958 to 212,114 tons in 1959. This is an increase of 17,627 tons per plant, or approximately 9 percent.

The 871 companies participating in the 1959 survey represent the largest participation for any year since these annual surveys were launched in 1953. The increased participation of 27 companies represents an increase of 3 percent in terms of participating companies. This increase is so small in terms of number of companies, however, that the 1958 and 1959 data are comparable in terms of the degree of industry participation. It is possible, therefore, to measure the increase in industry activity for these two years.

Table 2 is an analysis of the methods of transportation employed by the sand and gravel industry for shipping its product in 1959. Included for purposes of comparison are data from our 1958 survey. The respective percentages of the three types of transportation show a slight decrease in transportation by truck, with a corresponding increase in transportation by water. The percentage shipped by rail and unspecified methods remains virtually the same in 1959 as in 1958.

In 1959, truck transportation carried 187,294,092 tons of sand and gravel, or 70.3 percent of the reported production. The railroads transported 44,074,819 tons, or 16.6 percent of the production. Water transportation accounted for 26,573,289 tons, or 10 percent of the

TABLE 1—Sand and Gravel in 1957, 1958, and 1959

	1957	1958	1959
Production:			
Sand (tons)	97,170,144	119,989,477	131,302,239
Gravel (tons)	119,292,294	147,818,525	158,021,507
Total (tons)	216,462,438	267,808,002	289,323,746
Value:			
Sand	$ 97,678,911	$123,203,844	$141,806,418
Gravel	141,102,771	179,714,285	195,946,667
Total	238,781,682	302,918,129	337,753,085
Average value per ton:			
Sand	$1.01	$1.03	$1.08
Gravel	1.18	1.22	1.24
Total	1.10	1.13	1.17
Companies surveyed	1,463	2,058	2,120
Companies reporting	604	844	871
Number of plants operated by reporting companies	1,063	1,377	1,364
Average production per reporting company (tons)	358,382	317,308	332,174
Average production per reporting plant (tons)	203,634	194,487	212,114

1959 totals include 55 member companies not actually replying to the questionnaire but whose production of 23,082,326 tons of sand and gravel was otherwise available.

total. We were not advised of the specific breakdown by type of transportation for 8,299,220 tons, or 3.1 percent of the total.

Table 3 summarizes the consumption of sand and gravel in 1959 by type of consumer. The heavy construction industry (industrial buildings, highways, streets, etc.) consumed 113,799,912 tons, or 42.7 percent of the total. This represents a slight decrease in the percentage consumption by heavy construction from that reported in 1958, but is an increase of almost two million tons of actual production. The ready mixed concrete industry was the second largest purchaser of sand and gravel, using 88,045,347 tons, or 33.1 percent of the reported production. This was a slight increase in percentage consumption by ready mixed concrete when compared with 1958.

California led all states, with a reported production of more than 33 million tons, followed by Illinois, Texas, Michigan, Indiana, Ohio, New York, and Pennsylvania, in that order. Michigan led all states in total number of companies reporting, with 88, followed by Ohio, New York, Pennsylvania, and Indiana, in that order. . . .

Table 4 is an analysis of the distribution of sand and gravel production in 1959 by size of company, based on returns from the 816 reporters, plus the 55 member companies whose statistics were otherwise available, for a total of 871. The largest number of companies are in two brackets: 50,000—100,000 tons, in which there are 155 companies, responsible for 4 percent of the total production; 100,000—200,000 tons, in which there are 194 companies, responsible for 9.8 percent of the total production. These are the same two production brackets in which the majority of companies participating in our three previous surveys were classified.

Eleven companies reported individual production of more than three million tons of sand and gravel last year, accounting for almost 19 percent of the total production. Conversely, the 75 percent of companies in the smaller brackets produced less than 25 percent of the total tonnage.

TABLE 2—Methods of Transportation of Sand and Gravel in 1958 and 1959

Type of Transportation	1958 Short Tons	1958 Percent of Total	1959 Short Tons	1959 Percent of Total
Truck	181,543,490	73.1	187,294,092	70.3
Rail	42,335,436	17.0	44,074,819	16.6
Water	15,284,010	6.2	26,573,289	10.0
Unspecified	9,204,478	3.7	8,299,220	3.1
Total	248,367,414	100.0	266,241,420	100.0

TABLE 3—Consumption of Sand and Gravel in 1959

Type of Consumer	1958 Short Tons	1958 Percent of Total	1959 Short Tons	1959 Percent of Total
Construction (buildings, highways, streets, etc.)	111,775,954*	45.0	113,799,912	42.7
Ready mixed concrete	78,154,698	31.5	88,045,347	33.1
Concrete products	11,657,266	4.7	12,723,034	4.8
Railroad ballast:				
(1) Prepared				
(a) Less than 40% crushed	1,603,884	0.6	1,358,245	0.5
(b) More than 40% crushed	1,218,934	0.5	1,094,650	0.4
(2) Unprepared (bank run)	1,536,717*	0.6	2,089,294	0.8
Sold through dealers	21,902,551	8.8	21,607,598	8.1
Other	10,207,501	4.1	8,826,124	3.3
Unspecified	10,309,909	4.2	16,697,216	6.3
Total	248,367,414	100.0	266,241,420	100.0

* Revised

TABLE 4—Distribution of 1959 Sand and Gravel Production by Size of Company

Size Group (tons)	No. of Companies	No. of Plants	Production (tons)	Percent of Reported Production	Percent of Participating Companies	Percent of Participating Plants	Accumulated Percents of Totals: Total Production	Total Companies	Total Plants
0 – 25,000	103	109	1,309,395	0.4	11.8	8.0	0.4	11.8	8.0
25,000 – 50,000	97	103	3,546,132	1.2	11.1	7.6	1.6	22.9	15.6
50,000 – 100,000	155	172	11,448,403	4.0	17.8	12.6	5.6	40.7	28.2
100,000 – 200,000	194	248	28,406,963	9.8	22.3	18.2	15.4	63.0	46.4
200,000 – 300,000	109	153	26,664,468	9.2	12.5	11.2	24.6	75.5	57.6
300,000 – 400,000	54	80	18,667,130	6.4	6.2	5.9	31.0	81.7	63.5
400,000 – 500,000	23	47	10,032,583	3.5	2.7	3.4	34.5	84.4	66.9
500,000 – 600,000	21	44	11,169,822	3.9	2.4	3.2	38.4	86.8	70.1
600,000 – 700,000	19	44	12,318,815	4.3	2.2	3.2	42.7	89.0	73.3
700,000 – 800,000	15	35	11,068,879	3.8	1.7	2.6	46.5	90.7	75.9
800,000 – 900,000	8	23	6,929,631	2.4	0.9	1.7	48.9	91.6	77.6
900,000 – 1,000,000	12	32	11,156,672	3.8	1.4	2.3	52.7	93.0	79.9
1,000,000 – 2,000,000	37	124	51,225,884	17.7	4.2	9.1	70.4	97.2	89.0
2,000,000 – 3,000,000	13	75	31,660,811	11.0	1.5	5.5	81.4	98.7	94.5
3,000,000 – 5,000,000	8	51	32,347,892	11.2	0.9	3.7	92.6	99.6	98.2
Over 5,000,000	3	24	21,370,266	7.4	0.4	1.8	100.0	100.0	100.0
Total	871	1364	289,323,746	100.0	100.0	100.0			

This table includes the 55 member companies operating 82 plants which did not return our questionnaires, but whose total production of 23,082,326 tons of sand and gravel was otherwise available.

1959 Safety Competition Winners Announced by National Slag Assn.

TOP safety honors in the 11th annual National Slag Association Safety Competition were awarded to The Standard Slag Company's Corrigan-McKinney plant, Cleveland, Ohio, and to its Republic plant, Youngstown, Ohio, according to the U. S. Bureau of Mines. Each plant won a bronze plaque, provided by PIT AND QUARRY magazine, for having the best safety-record in its respective field: Corrigan-McKinney plant in Group A, and Republic plant in Group B. In addition to the trophies, the plants received from the Bureau of Mines a Certificate of Achievement in Safety for having operated throughout the competitive year without a disabling work injury. A Certificate of Accomplishment in Safety also was presented all employees and officials of the winning operations.

In previous years the slag competition started on April 1 and ended on March 31 of the year following. This was commonly referred to as a "slag-year." In 1959, however, members of the National Slag Association unanimously decided to change the competition period from "slag-year" to a calendar year, and to have the 1959 event cover only 9 months—April 1 through December 31, rather than duplicate the last quarter (January 1 through March 31, 1959) of the previous year's competition. Therefore, all man-hours quoted and shown in this report are based upon a 9-month record. All future slag competitions will be based on a complete calendar year, similar to all other safety competitions conducted by the Bureau of Mines.

• Group A—Plants working 60,000 man-hours or more—For the first time in 11 consecutive years of participation, the Corrigan-McKinney plant was awarded the PIT AND QUARRY plaque for winning top safety honors in group A. A record of 81,695 man-hours without a disabling work injury during 1959 was established. While this is the first time it has taken top honors, the Corrigan-McKinney plant has been awarded a Certificate of Achievement in Safety for posting a disabling injury-free record in three previous contests—1956, 1957, and 1958.

During the 11 years, the plant operated 1,627,839 man-hours and experienced 37 disabling work injuries, resulting in 699 man-days' loss charged to its record. This plant's 11-year frequency rate of injuries per million man-hours of exposure is 22.73 and its severity rate, 429.404.

Group B—Plants working less than 60,000 man-hours—The Republic operation had the best safety record in Group B in the 1959 competition—57,970 man-hours of exposure without a disabling injury. This Standard Slag Company plant has been enrolled continuously since the beginning of the competition in 1949. In this 11-year period it has had honorable mention in 1956. However, 1959 is the first time it has taken top honors.

In 11 years of participation, this plant has had only 14 injuries, resulting in a low frequency rate of 11.502 disabling injuries per million man-hours of exposure. These 14 injuries accounted for 6,734 man-days of disability, resulting in a severity rate of 5,532.378 days lost per million man-hours of exposure.

In this group, 23 other plants operated during the competition year without a disabling work injury. The Republic plant attained top honors for having worked more man-hours than any other injury-free operation in the group.

Injury-free operations — Employees and officials at 26* (53 percent) of the 49 competing slag-producing plants in 1959 achieved the outstanding safety record of operating through the competition period without any disabling work injuries. Men at these 26 plants, two of which were trophy winners, worked 907,825 man-hours, or 38 percent of the 2,412,859 man-hours worked at all participating plants.

In addition to the trophy winners, the following plants were awarded Certificates of Achievement in Safety, and each employee and official at these operations received a Certificate of Accomplishment in Safety from the Bureau of Mines for his help in achieving a record free of disabling injuries. These operations worked 20,000 or more man-hours during 1959 and are listed as follows:

South Deering plant, Illinois Slag & Ballast Co., Chicago, Ill., 54,403 man-hours
Pittsburgh plant, Duquesne Slag Products Co., Pittsburgh, Pa., 51,799 man-hours
Harriet No. 3 plant, The Buffalo Slag Co., Inc., Tonawanda, N. Y., 42,965 man-hours
East Toledo slag plant, The France Stone Co., Toledo, Ohio, 42,946 man-hours
Bethlehem slag plant, Bethlehem Steel Co., Bethlehem, Pa., 42,519 man-hours
Birmingham plant, U. S. Pipe and Foundry Co., Birmingham, Ala., 41,640 man-hours
Portsmouth plant, The Standard Slag Co., New Boston, Ohio, 34,672 man-hours
Aliquippa plant, Duquesne Slag Products Co., West Aliquippa, Pa., 33,555 man-hours
Donora plant, Cambria Slag Co., Donora, Pa., 32,267 man-hours
Sharpsville plant, Cambria Slag Co., Sharpsville, Pa., 27,334 man-hours
Midland plant, The Midland Slag Co., Midland, Pa., 25,520 man-hours
Ashland plant, The Standard Slag Co., Ashland, Ky., 25,141 man-hours
Sheridan plant, Sheridan Slag Co., Sheridan, Pa., 24,940 man-hours
Erie No. 5 plant, The Buffalo Slag Co., Inc., Erie, Pa., 23,870 man-hours
Lordstown plant, The Standard Slag Co., Lordstown, Ohio, 22,691 man-hours

Six injury-free operations did not receive certificate-awards because

they did not fulfill the minimum requirements of working 20,000 or more man-hours during the competitive year. Several other operations worked more than 20,000 injury-free man-hours during the competitive year, but did not receive certificates because they did not meet the enrollment requirements.

Rules of the competition for slag plants require companies to enroll their operations during the first quarter (prior to July 1) of the competition for 1959. In future competitions for slag plants, companies must enroll their operations before April 1 of the competitive year. Applications received after the enrollment period are accepted for statistical purposes only, and are not eligible for awards.

Injury experience—The overall injury experience at slag-producing operations participating in the National Slag Association Safety Competition of 1959 was one of the best in the 11-year history of the contest. In 1959, both the severity and frequency of injuries were lower than in 1958.

The injury-severity rate of 3,060.684 days lost per million man-hours worked in 1959 is the fourth-lowest in the 11 years of the competition; the lowest rate—1,038.224—was recorded in 1950. The 1959 rate was 23 percent less than the rate of 3,963.216 in 1958 and 34 percent less than the 11-year over-all severity rate of 4,613.588.

In 1959, the injury-frequency rate was 12.433 per million man-hours of exposure to work hazards, or 9.5 percent less than the rate of 13.733 in 1958 and 23 percent less than the 11-year rate of 16.116.

The 49 participating slag plants in 1959 operated 2,412,859 man-hours with only 30 disabling work injuries that resulted in 7,385 man-days of disability. These plants were situated in 12 states, as follows: 12 plants in Pennsylvania; 11 in Ohio; 8 in Alabama; 4 in Michigan; 3 in New York; 2 each in Illinois, Indiana, Maryland, and West Virginia; and 1 each in Colorado, Kentucky, and Texas.

Falls of persons caused 41.4 percent of all injuries, haulage 20.7 percent, handling materials or objects 17.2 percent, and hand tools 10.3 percent. These four classifications accounted for 26 injuries, or 89.6 percent of all injuries with stated causes. The severity of injuries, by cause, indicated haulage injuries, including one fatal injury, were responsible for 85.7 percent of all man-days lost at competing plants. Falls of persons caused 7.8 percent of all man-days lost, and machinery accidents 4.5 percent.

This safety competition, sponsored by the National Slag Association and conducted by the Bureau of Mines, is open to any slag-processing plant. It covers employment and injuries during the competitive year. The enrolled plants are classified into two groups according to man-hours worked in a plant during the year. Group A plants are those working 60,000 or more man-hours during the competitive year, and Group B are those working fewer than 60,000 man-hours. The plant with the best safety record in each group is awarded a bronze plaque by PIT AND QUARRY magazine. Each plant working 20,000 or more injury-free man-hours receives a Certificate of Achievement in Safety, and each employee and official of all injury-free operations in this group receives a Certificate of Accomplishment in Safety from the Bureau of Mines. Applications for enrollment and rules governing the competition can be obtained from the Branch of Accident Analysis, Division of Health and Accident Prevention, Bureau of Mines, U. S. Department of the Interior, Washington 25, D. C.

Manual on Small Dams Issued By U.S. Reclamation Bureau

The Bureau of Reclamation has published a new technical book *Design of Small Dams* as a guide for small water source organizations, public agencies, and engineers engaged in the design and construction of small dams and reservoirs.

The 611-page volume covers the more common types of dams now being constructed.

Copies of *Design of Small Dams* may be obtained for $6.50 from the Superintendents of Documents, United States Government Printing Office, Washington 25, D. C., or the Bureau of Reclamation, Denver Federal Center, Denver, Colo.

Geology of Indiana Gravel Covered in New Publication

Where are the most likely places to seek new gravel deposits? Why are gravel deposits where we find them? Why do some deposits yield commercial gravels, whereas others do not? These are some of the questions answered by the Indiana Geological Survey in its Report of Progress No. 17.

Entitled *Gravels of Indiana*, and written by Duncan J. McGregor, this publication examines the relationship between the geology of gravel and glaciation and discusses the most important tools that can be used in the exploitation of gravel deposits.

The report is available at $1 per copy (plus 10 cents for mailing) from the Publications Section, Geological Survey, Indiana Department of Conservation, Indiana University, Bloomington, Ind.

ROGER D. ENGLAND has been named sales representative in south Georgia for the Marquette Cement Manufacturing Company.

Potash Company of America Absorbs Canadian Subsidiary

Potash Company of America, Ltd., a wholly-owned Canadian subsidiary of Potash Company of America, Carlsbad, N. M., has been merged with the parent company. Potash Company of America has acquired all of the assets and assumed all of the liabilities of the former subsidiary. John W. Hall, president of the firm, described the move as indicative of the firm's intentions to proceed with development of the Canadian property.

Ore mined during a startup period of operations near Saskatoon, Sask., was reported to be of satisfactory grade. Operations had been suspended temporarily last November primarily because of seepage of water into the mining shaft. A water control project is now under way.

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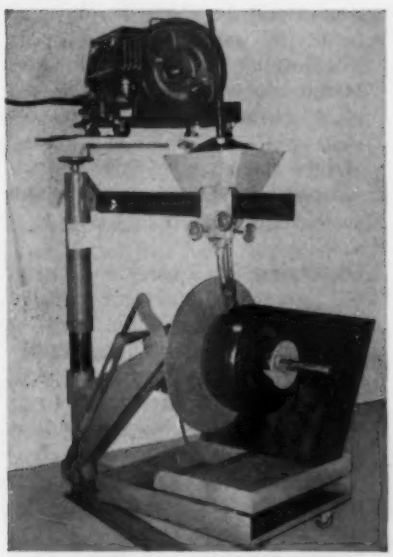

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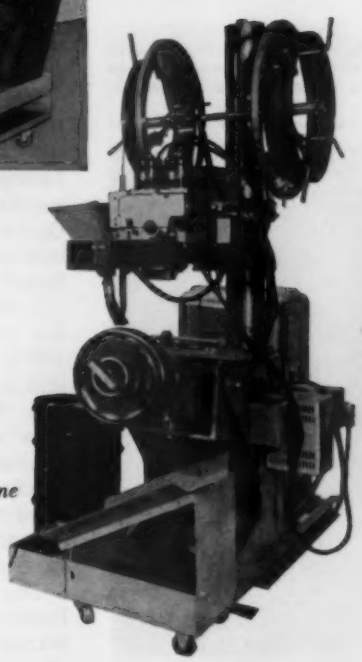


Automatic welding machine rebuilding a shovel roll.

Typical manual semi-automatic operation, open arc.

Stone, clay shipped by water route to

Lafarge's Vancouver Plant

By HARRY F. UTLEY

ANOTHER ON THE SPOT report

WHEN Lafarge Cement of North America, Ltd., started operations a year or two ago at its new $16,000,000 wet - process plant in Vancouver, B.C., a world-famous trade name was introduced to the American continent. At the same time, with this added 1,500,000 bbl. of capacity, the parent concern, Lafarge France, moved into third place among the world's cement producers, being exceeded only by Associated Portland Cement Manufacturers of Great Britain, and Lone Star Cement Corporation of New York.

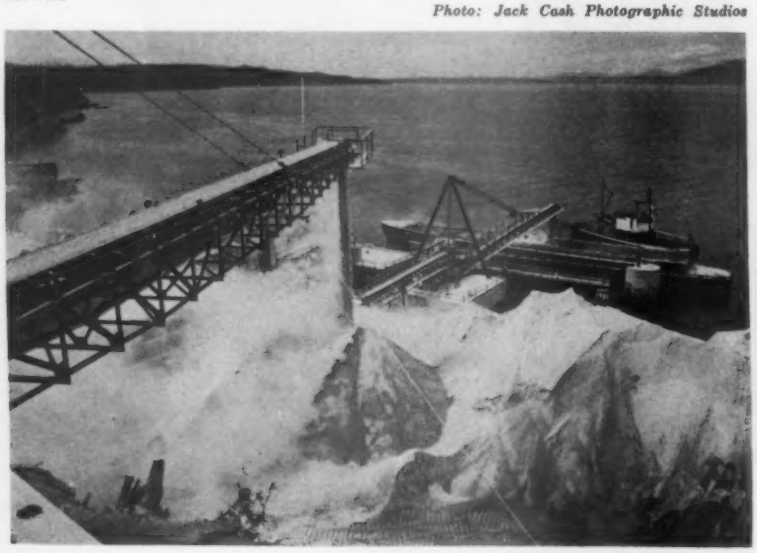
Little (if any) deviation from the original design, as revealed exclusively in an earlier illustrated article* published while construction was in progress, was observed when the completed plant was revisited by the writer in the late summer of 1959.

Strategically located on Lulu Island, on the south arm of the Fraser River, the plant is but a few miles from downtown Vancouver; and its product can be shipped with equal facility by water, rail, or highway. The location was chosen for this reason alone, since its chief raw materials must come in by water—limestone for a distance of 80 miles, and the clay about 25 miles. Minor components, such as gypsum and shale, are purchased.

*See PIT AND QUARRY, September, 1957, pp. 102-112.

STACKING AND BARGE LOADING CONVEYORS shown here are located on Texada Island in the Strait of Georgia, along with the quarry and crushing plant. The self-unloading barge carries more than 3,000 tons of material. Output of the plant is 400-500 t.p.h. of mill-feed material.

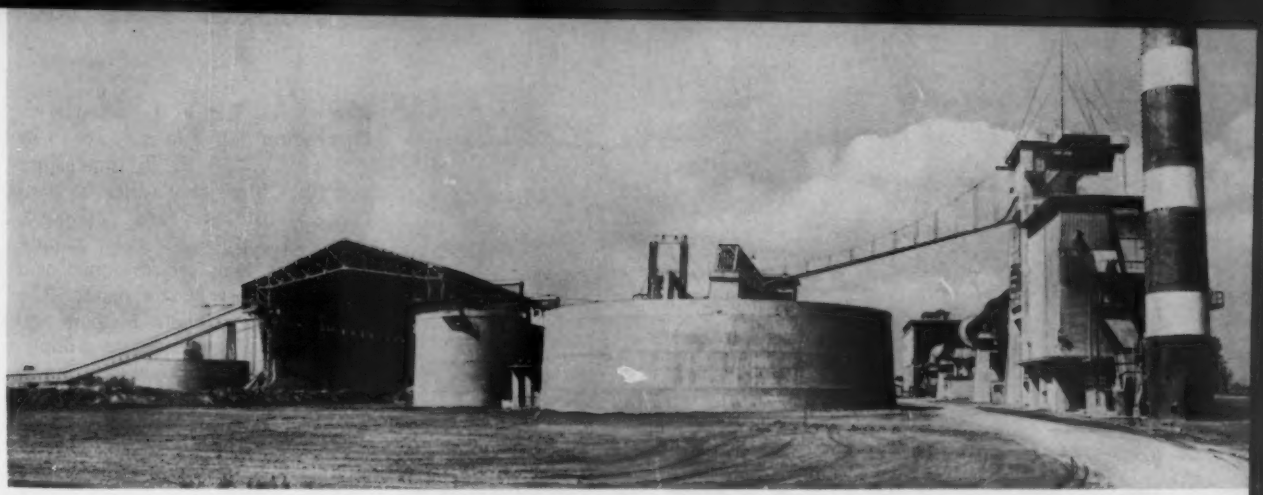
Photo: Jack Cash Photographic Studios



Quarrying The quarry and crushing plant are situated on Texada Island in the Strait of Georgia. Texada limestone is recognized as probably the most ideal stone for cement manufacture to be found in western North America; at least two other cement companies, one Canadian, the other a producer in the United States, obtains stone from the island. The Lafarge properties at Vananda were acquired from Beale Quarries, Ltd. Quarrying and processing facilities have been vastly improved and enlarged since Lafarge took over.

Drilling is done with a 6¼-in. Joy rotary, with which more than 100 ft. of hole can be put down per shift in the 60-ft. high, 600-ft. long face. The 6-in., 60-ft. holes are put down about 18 ft. apart and about the same distance from the face. Forcite 75 percent dynamite is detonated with millisecond-delay caps, the yield being about one ton of stone per half-pound of explosive.

The stone is loaded into 22-ton Euclid 63TD quarry trucks by a Bucyrus-Erie 71B diesel shovel



A PANORAMIC VIEW of the Vancouver, B.C., plant of Lafarge Cement of North America, Ltd. The kiln and dust-collector installation is at the right; the storage hall and galleried conveyor from the wharf is at the left.

equipped with a 3-cu. yd. bucket. The Eucs have about a ½-mile to haul to the crushing and screening plant on the waterfront.

Two Allis-Chalmers jaw crushers, a primary with a 60- by 48-in. feed opening, and a 48- by 36-in. secondary machine crush the stone preparatory to final reduction. Three Allis-Chalmers vibrating screens do the scalping and sizing. The first of these, a 5- by 12-ft. double-deck unit, has 10-in. openings on the top deck and 5-in. openings on the bottom.

This screen is also used to prepare two sizes of limestone sold to the paper and pulp industry; however, when producing minus ¾-in. mill-feed stone for the cement plant, it is bypassed in favor of reduction in the second Allis-Chalmers jaw machine.

Final reduction of mill-feed stone is accomplished in a 17- by 50-in. Pennsylvania Impactor, which is in closed circuit with a ¾-in. screen. Production capacity of mill-feed product is in the 400 to 500 t.p.h. range.

Raw Material A 1,600-ft. Stephens-Adamson belt conveyor system, including a 90-ft. boom stacker, builds up storage over a reclaiming tunnel. Two belts in the tunnel then deliver to a self-unloading, 14-compartment barge, which has a carrying capacity in excess of 3,000 tons.

The barge loads at the rate of 1,000 t.p.h. and discharges at the cement plant at about 500 t.p.h. It is operated by the Straits Towing Company, Vancouver, and is towed by an 800-hp. diesel tug.

At the cement-plant wharf the compartments are unloaded by a belt conveyor running beneath them, which transfers the stone to a 36-in. by 600-ft. Hewitt-Robins belt-conveyor operating in a gallery and leading to the plant storage hall.

The clay deposit is up the Fraser River at Matsqui, about 25 miles inland from the plant. Highly viscous in consistency, the sticky clay is difficult to handle as dug; so it is slurried and pumped *via* a 12-in. by 1,400-ft. pipeline into a tanker barge for delivery down-river to the cement plant wharf. A 4-cu. yd. Sauerman cableway 800 ft. between masts digs and delivers the clay to a 27-ft. diameter Smidth wash-mill at the pit where the moisture content is in-

THE CABLEWAY TOWER at the Matsqui clay deposit is mounted above the wash mill. The pipeline bearing off to the right leads to the clay barge, which ties up at the Fraser River wharf.

THE LIMESTONE-RECEIVING STATION at the cement-plant dock in Vancouver. A 600-ft. belt conveyor in the gallery (right) delivers the stone to the storage hall.

creased to about 55 percent prior to pumping.

Production of the clay slurry is at the rate of 50 t.p.h. of dry material. At the plant wharf the clay is pumped from the barge hold at 150 t.p.h. by 8-in. Wilfley pumps through an underground pipeline to an 80-ft. diameter storage basin. Here the slip is finally corrected for introduction into the raw mill, aided by a Dorr revolving mixer-agitator.

The covered storage hall, 30,000 sq. ft. in area, has a storage capacity of about 45,000 tons of limestone, clinker, and gypsum. Materials are handled by a 3-cu. yd. Appelvage clamshell bridge crane, which also keeps the compartmented feed hopper full.

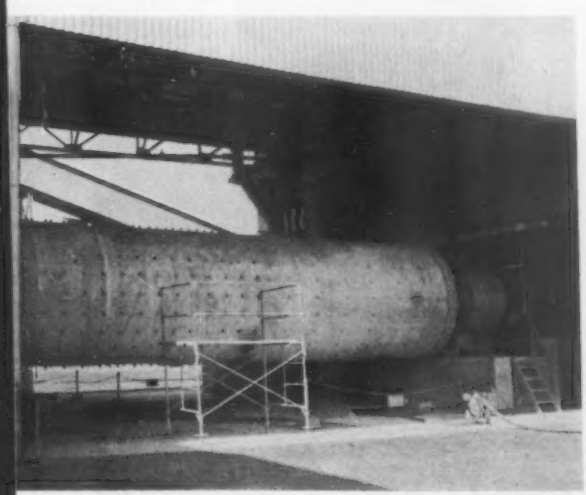
Raw Mill Raw-grinding is done in a 3-compartment Unidan ball-mill 9½ by 36 ft. in size. The mill is in open circuit and is powered by a 1,400-hp. synchronous motor through a Symetro drive. Proportioning of the raw components is done by Jeffrey-Waytrol feeders. The resulting slurry is pumped and distributed to a set of four 40-ft. diameter blending-correction tanks, thence to an 80-ft. diameter storage basin which supplies the ferris-wheel feeder on the kiln *via* pumps and pipeline. Dorr-Oliver-Long, Ltd., equipped the slurry tanks with the necessary mechanical- and air-agitation devices. Fuller rotary compressors supply the air.

Kiln Operation The F. L. Smidth rotary kiln is 11 by 13 by 426 ft. in dimensions and rides high on a series of reinforced-concrete arch supports. About 1,400 heat-transfer chains, each 14 ft. long, are festooned near the feed end for heat transfer. The kiln revolves at about 1 r.p.m. and is driven by a Sautter-Harle variable-speed motor through a V-belt and an F. L. Smidth speed-reducer. The motor also drives a 4 kv.-a generator which supplies power to the slurry feeder to keep a constant ratio between kiln speed and slurry feed.

Normally, Bunker C oil is used to fire the kiln, but either gas or pulverized coal can also be used through a multiple-burner arrangement. A 200-hp. generator heats the oil prior to atomization at the nozzle.

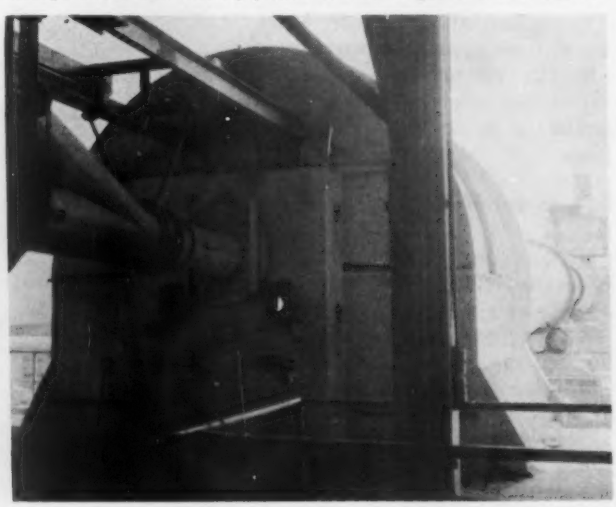
The kiln-control panel carries a full complement of recording and control instruments, as well as push-button start-stop switches which permit centralized operation of the plant right from the burning floor.

The kiln exhausts to a reinforced-concrete stack by way of a V.I.M. electronic precipitator designed and built in Sweden by Ventilation Industrielle et Miniere. It is a dual chamber installation, and either or both parallel chambers may be used. Dust recovery is reportedly about 98 percent. Power to the hanging electrodes is supplied by two 80-kv., 400-milliampere selenium rectifiers.



THE MILL BUILDING houses a 9½- by 36-ft. raw-grinding mill. A similar 2-compartment mill handles finish grinding.

KILN FIRING END. Oil is normally used for fuel for the 426-ft. kiln, although burner convertability permits the use of gas or coal if desired.



Clinker discharges to a Fuller No. 750 inclined-grate cooler and recuperator, which is equipped with a breaker, followed by a drag chain and belt conveyor which deliver the product to the storage hall. Clinker enters the cooler at about 2,500 deg. F. and leaves at about 150 deg.

Finish Mill Finish grinding is accomplished in a Unidan mill almost identical to that used on the raw side, except that it is a 2-compartment unit and is closed-circuited with Sturtevant air-separation equipment. Cement coarser than 3,000 to 3,100 Blaine is returned to the mill.

A Fluidor pneumatic conveying system employing compressed air transfers the finished cement to a bank of eight steel storage silos, two rows of four each, with interstice bins. Total capacity is about 50,000 bbl. The packhouse, directly alongside the silos, receives cement from them by Airslide conveyors.

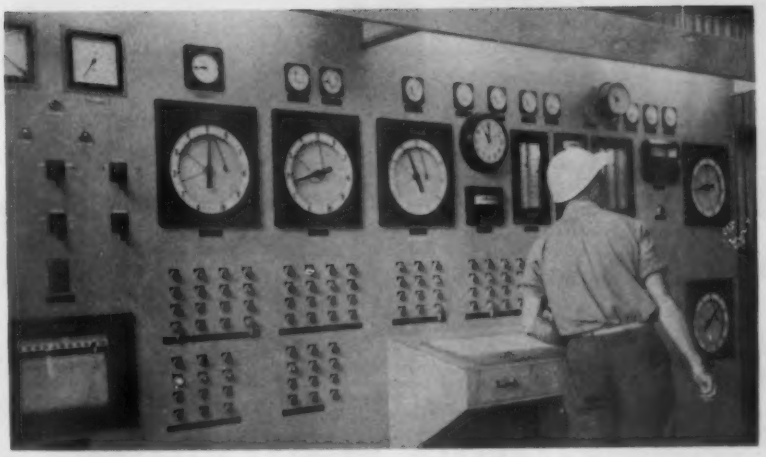
Loading Facilities installed here provide for bagging the product, or loading out in bulk to trucks and railroad cars, or to barges which tie up at the wharf. A dock-side marine elevator facilitates loading sacked product into barges or ocean-going vessels.

About one-half, or possibly a little more, of the product is currently bagged before shipment. About 45 percent of the total plant output is shipped by water, and nearly that much goes out by truck and trailer.

The plant layout anticipates future enlargement, and there is ample space to add three more kilns, as well as additional grinding equipment in the mill building, without disrupting production.

The plant is located in a rather sparsely settled section, ringed by peat bogs and it is not convenient to service establishments of any kind. A well equipped plant cafeteria is therefore well patronized by the plant personnel.

Personnel Albert Bouilloux is manager of the Lulu Island plant. Before coming to British Columbia Mr. Bouilloux was the engineer in charge of constructing four plants for Ciments Lafarge for the Government of Turkey.



INSTRUMENT PANEL AND PUSHBUTTON CONTROL BOARD on the firing floor in the kiln building, where plant operation is largely centralized.

STORAGE. Finished cement is stored in eight steel silos with a total capacity of 50,000 bbl. The packhouse is directly alongside (left).

General offices are located at the plant, and a sales office is maintained in the downtown Vancouver business district. Lieutenant-Governor Frank M. Ross is president of Lafarge Cement of North America. Vice-president and managing director is Jean Charles Lofficier, who was previously general manager of a Lafarge subsidiary in Morocco.

Company Growth The Lafarge industrial empire had its beginnings in 1830 in the Rhone River Valley, some 400 miles south of Paris. Through the years the organization has supplied cement for major projects all over the world, including the Suez Canal, the Port of Marseilles—even for the New York Stock Exchange! Today there are 28 Lafarge plants, with a total capacity equivalent to nearly 33,000,000 U.S. bbl. annually. About one-half these are in France. The pride of the Lafarge Group is perhaps the new plant at Boussens, near the Pyrenees Mountains. This plant has one of the longest rotary cement kilns in the world—524 ft. —with a daily clinker capacity of 700 metric tons.

Even moving a blade-full of shot-rock around the curve, there's no hesitation, no sluing to spill the load. The TD-25's operator has separate speed control of each track to get full-capacity performance, full time. And only the new TD-25 has the power plus of the direct-start, turbocharged DT-817 International engine—that delivers 230 high-torque hp!

HOW POWER-STEERED, POWER-SHIFTED . . . TD-25 takes

—on California mining operation

Even before all the blast dust has settled, this International TD-25 is slamming tons of shot-rock from the benches, so trucks can resume hauling to the processing plant. Then, at this gypsum mine in California, the "25" takes over the "shovel-feeding" chore—dozing full blades of rock upgrade, downgrade, and 'round the curves, to help keep the big dippers swinging full. And in between times, the "25" takes over its third tough project: benching new haul road around mountain slopes!

Three slam-bang rock operations to handle—it's a made-to-order situation for the Planet Power-steered TD-25!

"Dead-track drag" eliminated! You don't brake a track and "half-kill" your pull-power to turn, as you do with king-sized clutch-steered crawlers. With Planet Power-steering you simply change the speed of one TD-25 track—on-the-go, and with 2-finger ease! Around comes the fully-loaded TD-25—with "live" power on both tracks and both tracks pulling. Load-limiting "dead-track drag" is eliminated!

And combined, on-the-go Hi-Lo power-shifting lets you match power to load, instantly—forward or reverse. Just shift one track to high range—the other to low—to do slope-hugging, full-bite benching, or to operate straight ahead with off-center loads!

The "25" is platformed on new 7-roller tracks with double-box-beam frames. The design provides super undercarriage strength for slam-bang conditions—strength to match the full effort of the direct-start, high-torque DT-817 International Diesel engine.

Power-steer and power-shift the TD-25 with king-sized loads. Measure the bonus capacity you get with exclusive Planet Power-steering and Hi-Lo power-shifting. See how this control combination enables you to outearn other big rigs up to 50%. Then measure what it means to get this double-barreled advantage *only* in the TD-25—and as standard equipment *to boot!* Let your International Construction Equipment Distributor demonstrate.

International Harvester Co.
180 North Michigan Ave.
Chicago 1, Illinois
A COMPLETE POWER PACKAGE

International® *Construction Equipment*

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"Boulder-dozing" after blasting— The TD-25 does some "blasting" itself to move "big-as-a-house" hunks of rock aside. Heavy-duty TD-25 Dura-Rollers defy the rock-dozing "grind"—with the industry's thickest shells to prevent flexing—positive grit exclusion—and 1,000-hr.-interval lube capacity!

Here's your 76-page cost and production estimating book—newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* See your International Construction Equipment Distributor!

over three slam-bang rock jobs

Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

ANOTHER P&Q EXCLUSIVE

A FEW weeks ago a higher court clearly answered a legal question often submitted by readers of PIT AND QUARRY. This question is: "If a city, county, state or the United States condemns and appropriates land for public purposes can the property owner recover payment for machinery, such as concrete block machines?"

The answer is in the affirmative, although a sale contract made by the buyer and seller of the machine states that the machine is chattel or personal property and not a part of the real property.

For example, in *C. v. United States,* 273 Fed. Rep. (2d) 392, the testimony showed facts, as follows:

One C. was the owner of a tract of 5.06 acres of land upon which he operated a concrete block manufacturing plant. The United States condemned the land and took the fee title to the land by the exercise of eminent domain for the purpose of providing additional facilities and area for its nearby air base.

At the time the land was condemned and appropriated by the United States there were two concrete block machines; one of which was designated as the Columbia machine and the other as the Stearns machine.

Both were so affixed and used as to make them a part of the land. In the operation of each machine sets of conversion parts and mold boxes could be used in the making of different shapes and sizes of blocks. The sets used with one machine could not be used with the other nor could they be used with any other machine without being adapted by expensive precision machining.

The seller had sold one of the concrete block machines to C. on the installment payment plan. This seller held a chattel mortgage on the machine. The sale contract provided that "the 'chattels' shall not become part of the freehold." The mortgagee (seller) was given the right, upon default, to take possession of, remove, and sell the mortgaged machine.

It was contended by the government that the provision in the chattel mortgage shows the intention of both the seller and C. that the machine was not part of the land but a chattel. Hence, the government's lawyer argued that the government need not pay C. the value of this concrete block machine. In other words, the government lawyer contended that the government need pay C. only the value of the land.

It is interesting to observe that the higher court held that the government must pay to C. the full value of the condemned land, plus the value of the two concrete block machines, parts, molds, etc. This court said:

"As between the mortgagor and mortgagee, the contractual provision may be effective. This principle, applicable as between the parties to an agreement, is not appropriate in a condemnation proceeding so far as fixing, as between government and landowner, the character of fixtures annexed to the land. The government condemned the fee simple title to the land. The evidence, without conflict, showed the machine to be a part of the freehold."

Shift of Weight Caused Injury

Last month a higher court awarded heavy damages to an employee injured when the truck driver of a concrete block company suddenly let loose of a concrete lintel which both men were lifting. Both the jury and the higher court held that this act of negligence resulted in the truck driver's employer being directly responsible and liable for the employee's injuries.

For instance, in *Muska v. E. Block Company,* 101 N. W. (2d) 38, it was disclosed that one Muska was employed by a contractor. One day he suffered a severe back injury while engaged in lifting and pushing a concrete lintel from a delivery truck onto the second floor deck of a partially completed commercial building. This particular lintel was 10 ft. in length, 8 in. high, by 4 in. wide, and weighed between 300 and 400 lb. This lintel, along with several others, had been delivered to this job site by a motor truck owned by the E. Block Company. The testimony showed that while the two men were attempting to raise the lintel the truck driver had negligently taken his hands off the lintel

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H. K. PORTER COMPANY, INC.
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Now "trade" dead weight for payload..and haul 40% faster!

Heap-load the big-target Payhauler body in minimum time. Strong rock-ribbed corrugations absorb shock—resist wear and distortion. Choose the "95" with power-shift Torque-Converter, or 9-speed air-shift transmission.

New strength-multiplying corrugated body design results in payload-gaining weight reduction of both International Payhauler models. New "95" capacity is increased to 27 tons—and the new "65" becomes the only 19-tonner on the market!

Look at those exclusive, rock-ribbed body corrugations! International applies this strength-multiplying principle to reduce Payhauler® body weight by an amazing 30%! You "trade" 2½ tons of power-wasting dead weight for 3 bonus tons of payload capacity in the new 95 Payhauler!

New high-torque, high-output diesel power highballs 27-ton payloads up to 40% faster than the former "95" could haul only 24 tons! The new 375 hp DT-817 International diesel engine gives the new 95 Payhauler the wallop of 40 extra turbocharged "horses."

Prove to yourself that top load-carrying capacity plus top power-to-weight ratio give 95 Payhaulers tremendous profit-earning advantages. Add up other big Payhauler exclusives: fast reverse, up to 7.1 mph. for spotting speed; big-target bodies for loading zip; 11-second inverted-hoist dumping; load speeding safety of torqmatic braking and positive power-steering! Let your International Construction Equipment Distributor demonstrate!

International® Construction Equipment

International Harvester Co., 180 N. Michigan Ave., Chicago 1

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causing a sudden transfer of weight, thereby injuring Muska.

Muska sued the E. Block Company for heavy damages, contending that negligence of its truck driver in letting go of the lintel caused his injuries.

The jury held the E. Block Company liable in damages to Muska, and the higher court approved the verdict, saying:

"We cannot say that as a matter of law that the sudden transfer of weight by one of the two handling the lintel weighing 300 to 400 lb. is not negligence. The jury had the right to accept Mr. Muska's description of the event, and that the truck driver-agent of the E. Block Company took his hands off of the lintel without using due care."

Law of Consideration

A few days ago I received an interesting letter from an official of a large corporation engaged in manufacturing and selling concrete blocks. He said: "In past writings in PIT AND QUARRY you said that a contract without consideration is void. Also, you stated that a contract is void if either party is not obligated to do something for the other party. Please explain details for me, as I am confused."

It is certain that a contract without "consideration" is void and unenforceable.

Lack of "consideration" in contracts results in many surprising and adverse verdicts. Take, for example, a late case in which the higher court held a seller of concrete liable in damages to the other contracting party because the seller failed to realize that a mere promise made by one contracting party and *no* promise to do something by the other party does *not* result in a valid and enforceable contract. The legal outcome of this litigation proves that both contracting parties must agree to perform some kind of service, work, or benefit. Otherwise, the contract is void and ineffective.

In another case, a person named Brown signed a contract to do certain work for a sand and gravel company. The contract did not contain a clause obligating the company to perform some service for Brown.

In later litigation the higher court held that the company was not entitled to a recovery of damages from Brown who failed to fulfill his promise and explained that the contract was not valid because the company had not given any consideration.

In another case the contract was long and complicated, and it contained a clause stating that one Apple would purchase, monthly, a large quantity of concrete from the company. However, by error, the writer omitted to include a paragraph that the company would sell concrete to Apple.

It is interesting to observe that this contract was held void for want of mutual obligations and consideration.

Also, see *Bartlett,* 271 Ill. App. 551. Here it was shown that a seller had a lien to secure payment of $3,000.00 on rock materials. Later a subsequent buyer of the materials promised to pay the holder of the lien $2,000.00 However, since the lien was effective with respect to the first buyer and not to the second buyer, the higher court held the latter not obligated to pay this $2,000.00 because no consideration had been agreed upon, as between the seller and the second buyer. This court said:

"Consideration is not injected into a contract by the fact that one or many considerations are available. The consideration must be selected by the parties."

Also, take for a further example, another leading case in which an official of a cement company agreed to pay compensation to a company employee who was injured while he was not working for the company, but while the employee was doing work at his own home for his own benefit. In this case the higher court held the company not liable for payment of compensation to the employee because there was no valid consideration, since the employee had neither done anything nor promised to do anything for the company.

On the other hand, in another

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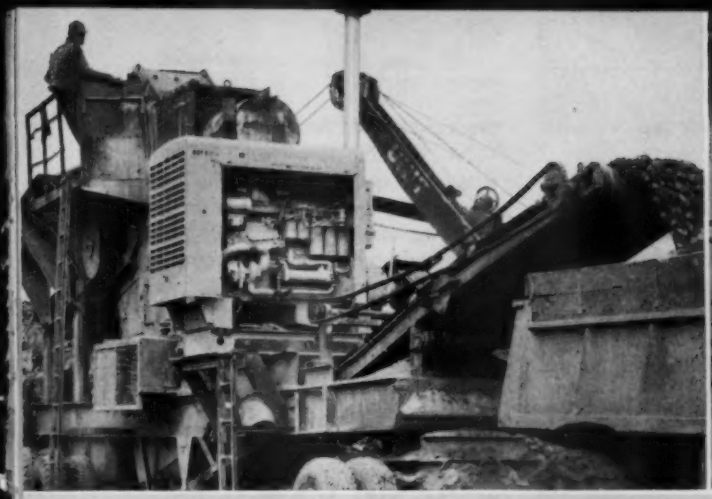
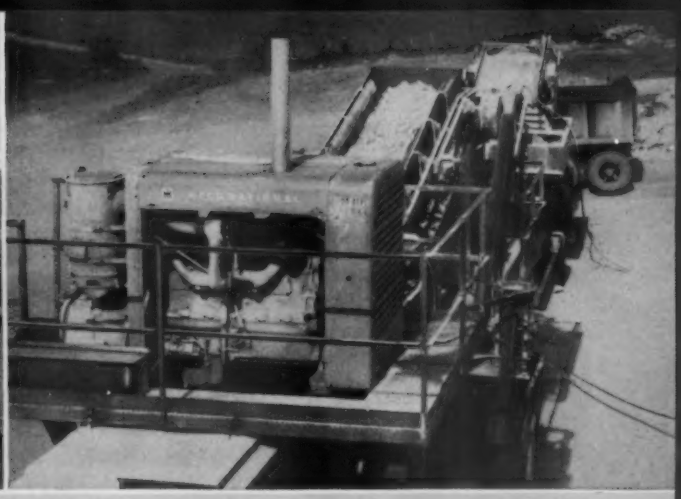


Roy Baker, of Valley Falls, Kans., got 20,000 hours of trouble-free performance from his original IH diesel before replacing it with a new UDT-817. Other reasons for choosing International were easy installation, direct starting and superior sealing. "Fuel consumption on the 817 is low, and with all that power we can eliminate secondary crushing by just reducing the jaw opening," say the Baker Brothers.



Eugene Nelson of Madison Stone Construction Co., in Wisconsin, got this contract off to a fast start with UDT-817 power. "Our profit depended on continuous high production," he reports. "We aimed at 180 tons per hour, but have been able to load out over 200 tons per hour! Specs called for crushing the hard Niagara limestone to minus one inch. We needed more power in a smaller unit and this UDT-817 fills the bill."

International UDT-817 gives you best power for BIG CRUSHING JOBS—Here's proof...

The heaviest crushing jobs are easily handled by this rugged International diesel. Field reports, like those shown here, prove big savings result when your crushing plant is powered by a UDT-817. Here's why...1) The UDT-817 develops 385 max. hp to lead the field in its size class. 2) Specific fuel consumption of the UDT-817 is the lowest in its size class. 3) The UDT-817 is the lowest priced engine in dollars per horsepower in its size class.

While the new 385 hp UDT-817 diesel heads up the International engine line, you can choose from 34 other diesel and carbureted models ranging upward from 16.8 hp. Save on operating and repowering costs by checking with your International Engine Distributor or Dealer, or by specifying dependable International power in new machines. All 35 engines have one common feature: fastest payback power for users.

The West Texas Construction Co. of Lubbock, is crushing caliche at 300 tons per hour with UDT-817 diesel power. The rock is crushed to minus 1¾ inch. Limited by feeder capacity, the big, new International delivers only 265 continuous hp @ 1,800 rpm.—that's power to spare! Other IH power on this job includes a carbureted U-264 engine on the feeder, and a UD-18A diesel on the air compressor.

INTERNATIONAL®
IH ENGINES

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

late case the testimony showed that a company's official agreed to pay an employee a bonus of $1,000 each year for five years, if this employee would leave his present employment and take employment with the company. In this case the court held the company obligated to pay the $1,000.00 annual bonus, because the company was benefited by the employee taking the new employment and rendering valuable services for the company.

In other leading litigations, the courts have held that valid consideration of a contract need not be any special service or benefit, and that a mere promise on the part of one party to do something is valid consideration, if the other party also promises to do something for the other contracting party.

In *Schwartz,* 39 N. E. (2d) 548, the higher court held:

"A valuable consideration consists in the acquisition of some legal right by the promisor, in return for which he makes the promise, or in the giving up of some legal right by the promise, in return for which the promise is made to him, and if the promisee gives up a legal right such forbearance is a "consideration" even if the exercise of that right would not in fact, have been profitable to him."

For comparison, see *Sid,* 158 S. W. (2d) 224. Here the testimony showed that a purchaser and a seller entered into a valid contract. Later they made a supplement contract in which the seller agreed to make delivery of the purchased merchandise on a date earlier than that specified in the original contract.

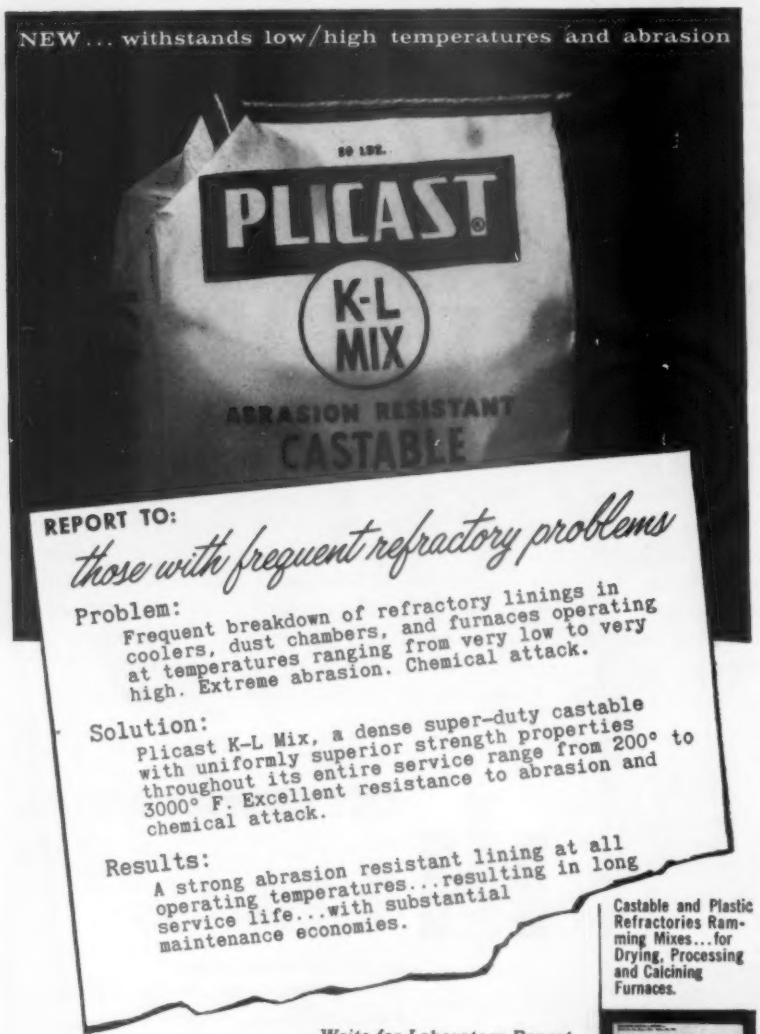
The higher court held the supplement contract void for lack of consideration on the part of the buyer.

On the other hand, in *Boos,* 34 N.Y.S. (2d) 743, the court held that a promise made by a creditor to delay enforcement of a debt is a valid "consideration" for a promise by a third person who was not otherwise obligated to pay the debt.

Sometimes a contract is rendered void by an act in the nature of fraud by one party, although previously the contract was valid.

For example, in the leading case of *H. Company v. H. Company.,* 35 S. W. (2d) 521, the testimony disclosed that a property owner contracted to pay a contractor a specified amount for excavating gravel from a specified area. After the work was begun, an old abandoned concrete swimming pool was discovered by the contractor, the removal of which would necessitate a considerable amount of extra work and expense the contractor had not figured on.

In subsequent litigation, the contractor proved that the property owner knew that the swimming pool was embedded in the gravel. Therefore, as the property owner had failed to be honest and notify the contractor of the hidden obstruction, the higher court held that the contractor need not complete the contract unless the property owner would pay the contractor for extra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Raise the clam and you have a full-size, full-capacity dozer for stripping overburden or pushing gravel down the bank, tons at a time. 'Dozer rides on exclusive "skid shoes," to keep cut accurate, and prevent uneven blading.

Doubles for DOZER, SHOVEL, SCRAPER, CLAMSHELL... *even dynamite!*

Clam-action 4-in-1 offers you money-making possibilities, unlimited

Open the clam of an International Drott 4-in-1 and a whole new range of equipment versatility opens for you. Each big-capacity 4-in-1 action "doubles" for one or more specialized earthmovers!

Skid-Shovel action takes over for the power shovel —and with tremendous triple-power, pry-over-shoe break-out action often doubles for dynamite in grubbing stubborn stumps, buried boulders, or hard clay, gumbo, and rock. *"Carry-type scraper"* action works like a scraper or dragline on jobs like stripping overburden...also gives you grader-like precision on haul road maintenance. *Clamshell action* lets you "back-drag"; grab and load solid objects like stumps; "surround" loose materials without chasing them! *Bulldozer action* gives you versatile blading, depth-regulated by radius control!

You adjust and control each 4-in-1 action, seconds-fast, hydraulically from the tractor seat. Each action gives you a wide range of job-handling working positions. And only the 4-in-1 has the positive performance protection of shock-swallowing Hydro-Spring!

Just move the machine selector lever to put a whole spread of equipment actions at your fingertips!

Prove first hand that a versatile 4-in-1 can give you money-making ability, unlimited! Let your International Drott distributor demonstrate!

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Instead of burrowing into the bank and risking slide dangers, use clam to back-drag loose material within safe reach. Then load either with clamshell or regular 4-in-1 bucket action.

Get higher reach than roll-forward type buckets by bottom-dumping! Opening the clam pulls sticky material from bucket surfaces—gravity pull does the rest!

Quaker Thermoid

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The hose that wears like a truck tire!

Tough braided rayon cord
Oil proof and heat resistant synthetic tube
Positive-bonded rubber friction layer
Red neoprene cover resists oil, abrasion, weather

Work like this is rough on hose, but Thermoid-Quaker "Versicon" takes it in stride. "Versicon" hose is built for high air pressures, up to 300 psi. It's built to withstand dragging over jagged, abrasive rock. It resists oil, baking sun or freezing cold. It's the heavy gauge, tough neoprene cover that takes this kind of surface abuse.

The tough braided rayon reinforcement gives it the extra strength to withstand high working pressures.

The tube is a specially compounded synthetic that's oil proof, heat resistant and will not flake or chip.

"Versicon" is made in all sizes up to 1½" and in lengths up to 500′ in some sizes. Also in one, two or three braid constructions for use with water, oil, grease, solvents, sprays and mild chemical solutions.

See your experienced Thermoid Division Distributor for the right hose for your requirements, or write: *Thermoid Division, H. K. Porter Company, Inc., 200 Whitehead Road, Trenton 6, N. J.*

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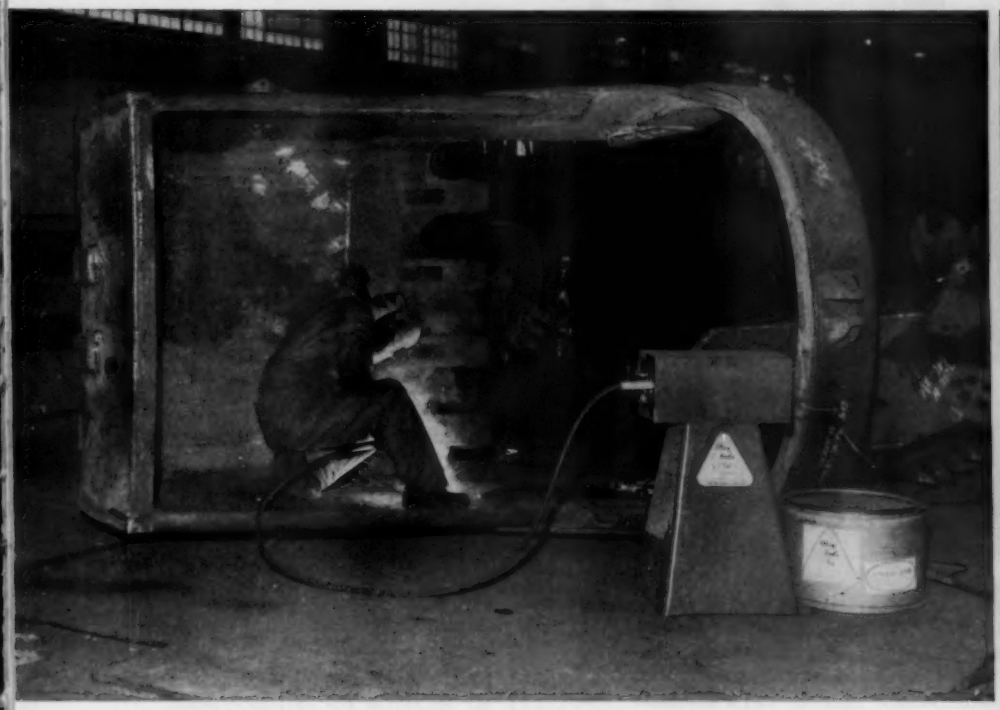
NEW WEAR-O-MATIC WH Produces High Strength Manganese Attachment Welds Equal to 308 Stainless For PAGE ENGINEERING COMPANY



The Page Engineering Co. was founded in 1903 by Mr. John W. Page who originated the dragline method of digging. Today Page Engineering is the nation's leading manufacturer of dragline buckets, walking draglines and other equipment used in dragline operations.

High strength properties and crack free deposits are the two major requirements for welding alloys used to attach manganese parts to PAGE AUTOMATIC BUCKETS made of high strength alloy steel. Until recently, only type 308 stainless manual electrodes satisfactorily met both requirements. Other alloys have been tested from time to time but failed one or both tests leaving Page no choice but to continue using 308 stainless electrodes for critical joints.

Now, new Wear-O-Matic WH semi-automatic wire developed by Alloy Rods Company fills both the requirements by producing high strength properties identical to those of 308 stainless electrodes while depositing absolutely crack-free weld metal. The Page Engineering Co. has replaced most 308 stainless welding in their dragline bucket production with new Wear-O-Matic WH alloy, gaining the economies of semi-automatic open arc welding and retaining the same high strength requirements for manganese attachment welding. Page engineers report Wear-O-Matic WH gives them the additional advantages of faster deposition and smoother arc characteristics—better than any semi-automatic wire they have ever used in the production fabrication of dragline buckets.

You too, can benefit from the experiences of Page Engineering. For any application involving the high strength attachment welding of manganese, whether it be production fabrication of manganese parts or field maintenance, Wear-O-Matic WH will do the job better than any alloy you are now using and do it semi-automatically. Contact your Alloy Rods Company distributor or Hard Surfacing Specialist for specific application information. Or write direct to Alloy Rods Company, P. O. Box 1828, York 32, Pennsylvania.

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Philip Beauchamp recently started business for himself, general contracting in Reading, Massachusetts

"I BOUGHT THIS D6 USED. IT'S MAKING MONEY FOR ME!"

When a man goes into business for himself, he can't afford to take chances on his first machine, can he? As an operator, Philip Beauchamp was sold on Cat-built rigs, so he dropped in to see his Caterpillar Dealer. There he met a salesman who helped him with some friendly advice and showed him a fairly priced used "Bonded Buy" D6.

Actually, beyond his experience with Caterpillar equipment, the "Bonded Buy" guarantee influenced his decision. This is the safest buy in used equipment you can make anywhere. Exclusive on reconditioned Cat-built machines, it is a bonded guarantee—up to $10,000—of satisfactory machine performance and on *all* parts and labor during the guarantee period. Your Caterpillar Dealer, with his large selection of used equipment, also offers you two other types of protection—a "Certified Buy" and a "Buy and Try" deal on used units of any make.

Whether you're just beginning, middle size or a big contractor, you'll find as Philip Beauchamp did, you get your money's worth from your Caterpillar Dealer. He has a wide selection of reconditioned, classified and guaranteed trade-ins at fair, reasonable prices. He's interested in *your* needs and *your* problems and backs you with prompt service and parts you can trust. Don't buy "blind." See him —he's listed in the Yellow Pages.

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BEST BUYS IN NEW AND USED EQUIPMENT

work in removing the concealed swimming pool. The court said:

"If the natural formations are different from what was expected by the excavator, he cannot claim extra compensation because of the increased cost of doing the work . . . Here we have hidden concrete . . . There was nothing to indicate the hidden obstruction. He (contractor) was within his rights in assuming that the work of excavating would be determined by the character of material which had been placed by nature."

What Is Negligence?

A manufacturer of concrete pipe asked: "Under what circumstances is an employer not liable where his negligence causes injury to an employee? I know that generally an employer is liable under these conditions, but what are the exceptions?"

Obviously, no employee may be prevented from recovering damages for an injury or illness resulting from primary negligence of his employer. On the other hand, an employee who performs dangerous work automatically forfeits his right to sue and recover damages from his employer for certain injuries.

For example, in a leading higher court case, an employee filed suit for damages, contending that the employer negligently supplied him with a defective appliance. In refusing to allow damages to the employee, the court said that, since the employee knew that the appliance was defective his own primary negligence resulted in the injury. The court said:

"We concur that plaintiff (employee) had assumed the risk."

Therefore, no employee is entitled to recover damages from an employer where the evidence indicates that the employee realized the danger associated with his work, and he failed to use prudence and caution to avoid the injury.

A review of higher court cases disclosed that an employee is not entitled to recover from his employer damages if he is injured (1) while he is acting outside the scope of the regular employment; (2) or while he acts in disobedience to his employer's instructions; (3) or if he fails to use ordinary care to protect

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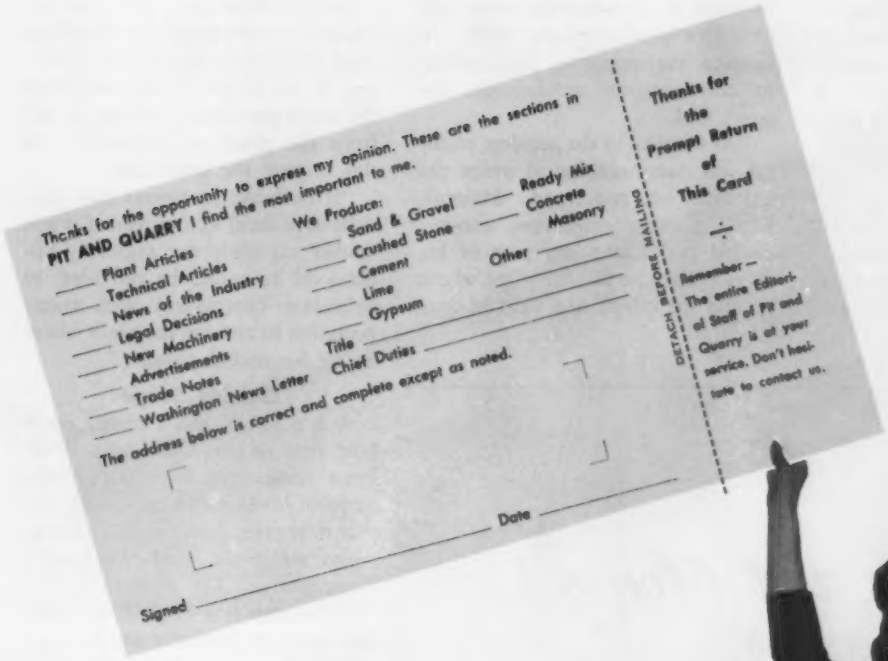

Thanks . . .

Recently many of our readers received a card like the one pictured above. Your cooperation in returning this card with the requested information has been very gratifying.

We send this card to many of our readers every month to keep a close tab on their reading preferences. When we have the products produced and title information along with reader preference it is a big help in our editorial planning.

Our sincere thanks to those who returned the card. Your cooperation is most appreciated.

To those who didn't return the card, may we expect your cooperation the next time you are polled? It is to our mutual advantage as the editors use this information along with other data to give you the best possible magazine for your use.

pit and quarry

Publications

431 S. Dearborn St. • Chicago 5, Ill.

himself against the injury; or (4) if he quits his regular work and is injured while performing some act for his own benefit and not associated with the employment; (5) if he is injured while off his employer's premises without authority; or (6) if his own negligence is the primary cause of the injury.

For instance, in *Zurino*, 291 N. W. 637, it was shown that an employee was injured during the noon hour, while riding in the foreman's automobile, from his regular place of work to a restaurant where the employee intended to eat lunch. In holding the employee not entitled to compensation or damages the court said:

"At the time of the accident plaintiff was doing nothing in which the employer was concerned. Plaintiff, like the other employees, entirely ceased performing any part of his service when he left the place where he and the others had worked during the forenoon."

On the other hand, this court explained that the employee may have been entitled to recover compensation if the employer had furnished the employee transportation to and from the place he ate lunch. In this respect, the court said:

"It exclusively appears that incident to plaintiff's employment it was neither expressly nor impliedly understood he would be provided by defendant (employer) with transportation to or from the place where he ate his noonday lunch."

Outside Scope

A few weeks ago a higher court held that an employee who is injured while doing work outside the scope of his employment cannot expect to recover damages or compensation under the State Workmen's Compensation Act.

For example, in *Texas Employers' Insurance v. L. Transfer and Storage*, 307 S. W. (2d) 271, an employee named Monroe reported to work, and then got into an automobile of a fellow employee, who drove to the house of still another employee. The trip over to the house was without direction or authority from the employer. On the way back to the employer's place of business Monroe sustained a severe injury.

The higher court held that the employer was not responsible nor liable to Monroe for his injuries, saying:

"An injury has to do with the work or business of the employer when it results from a risk or hazard which is necessarily or ordinarily inherent incident to the conduct of such work or business. In the case at bar, appellee (Monroe) made an unauthorized trip for an unauthorized purpose. He was not on a mission required by his employment."

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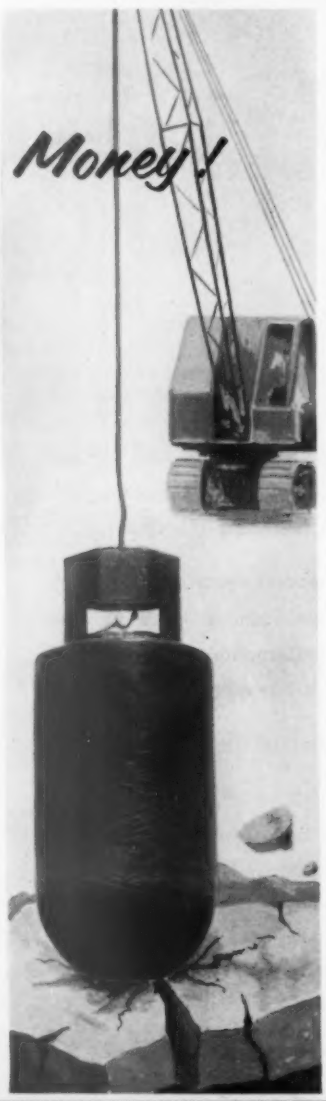

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P.O. BOX 360 · GLOUCESTER · MASSACHUSETTS

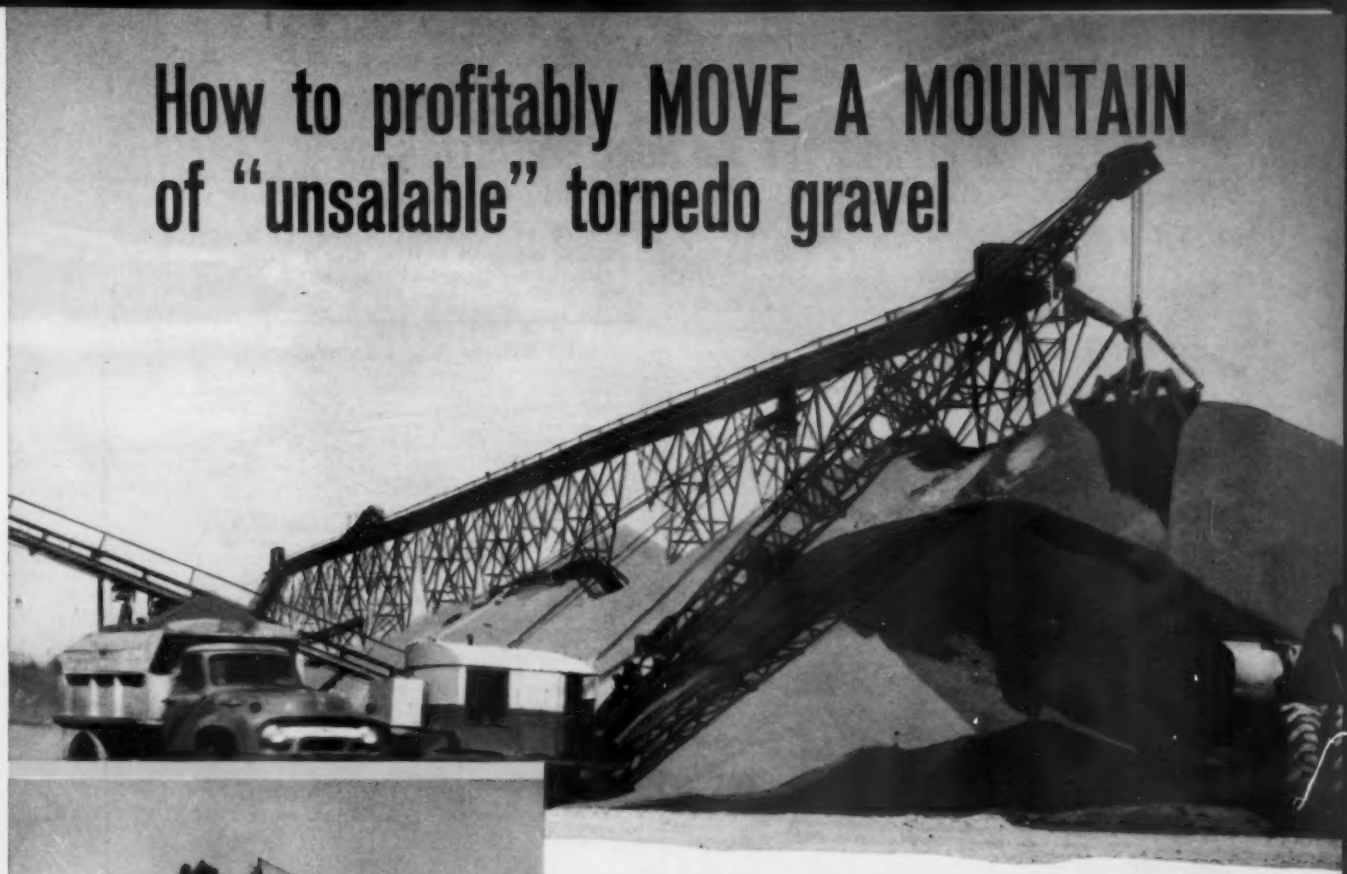
Enter 142 on card, page 145

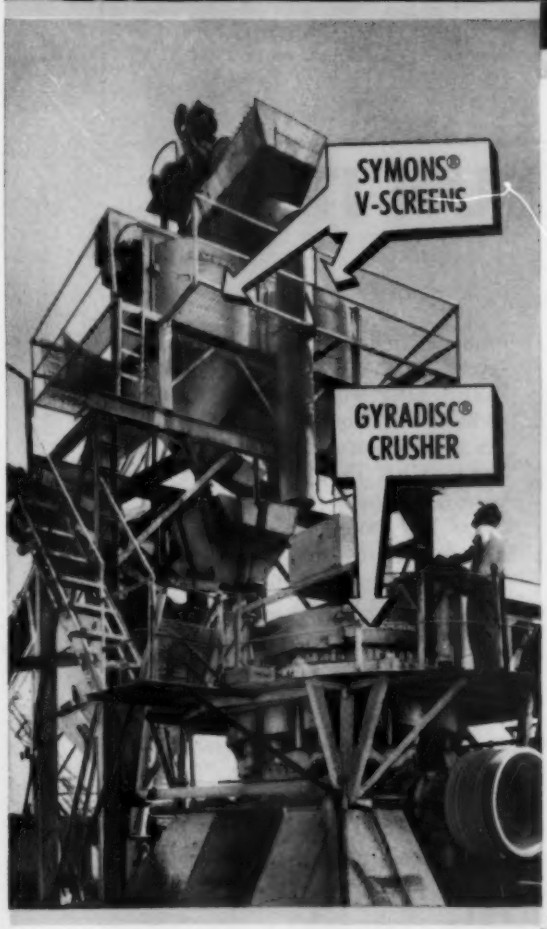
CHECK
LEGAL DECISIONS

each month for discussion of litigation applicable to the industry.

Enter 143 on card, page 145 →

How to profitably MOVE A MOUNTAIN of "unsalable" torpedo gravel





When a mountainous pile of unsalable torpedo gravel threatened to engulf its plant property, Winter Bros. Material Co., Fenton, Missouri, producers of sand and gravel in the St. Louis area relieved their space problem and turned the big liability into a tidy profit. This was accomplished by the installation of a 54-in. Gyradisc Crusher and two Symons V-Screens. The Gyradisc converts ⅜-in. torpedo gravel (pea gravel) into salable, manufactured sand and another premium product, a filter medium, is produced through one of the two Symons V-Screens. The other V-Screen dewaters the torpedo gravel before crushing.

At present, the Gyradisc Crusher and the two Symons V-Screens handle a daily production of up to 500 tpd on intermittent operation.

In many operations, Gyradisc® Crushers supplement Symons® Cone Crushers for volume production of fine specification material. They are used for the production of agricultural limestone, limestone chips, sand, rock dust, crushed stone for asphalt mix and the fine reduction of asbestos, slag, talc, etc.

Write for Bulletin 228.

NORDBERG MFG. CO., Milwaukee 1, Wisconsin

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NO REPAIRS YET and NONE EXPECTED SOON

Left: Dredge of Hubbard Sand & Gravel Co., at Bay Shore, Long Island, N. Y.

Hubbard Sand & Gravel Co.
129 Third Ave., Bay Shore, N. Y.
BAY SHORE 7-1808

April 11, 1960

Thomas Foundries, Inc.
Birmingham, Alabama

Gentlemen:

I want to thank you for your interest in our pumping operation. One of your capable engineers visited us the other day and inspected our 8" Thomas Dredge Pump. He did this without our asking for this service.

I was more than pleased to find that after a season and a half operation the wear on this fine piece of equipment was negligible. We now expect to get another season or even two from the original shell and impeller!!

Before arrival of the Thomas Pump, we wondered if we had been wise in our selection. After it arrived there was no longer any doubt - the other pumps look like peanuts in comparison. Also, they require almost constant welding and repair.

I never do anything to my Thomas Pump except run it. Thank you for a fine pump.

Yours truly,

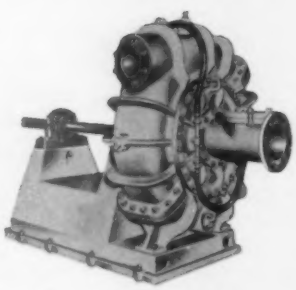
HUBBARD SAND AND GRAVEL CO.

Theodore F. Hubbard

Mr. Hubbard says: "I NEVER DO ANY-THING TO MY THOMAS PUMP EXCEPT RUN IT!"

Left: Theodore F. Hubbard.

Theodore F. Hubbard of Hubbard Sand and Gravel Co., Bay Shore, Long Island, New York, frankly says he first "wondered if he had been wise" in selecting a Thomas pump. Now, after operating his Series HL Thomas DURABLE Dredge Pump, 10" suction, 8" discharge, for a year and a half, he is equally frank to say "there is no longer any doubt—other pumps look like peanuts in comparison"!



Thomas DURABLE Dredge Pump used by Mr. Hubbard.

After 18 months service, wear on the impeller and shell liner is negligible. There have been no delays, no shut-downs, no tinkering, no adjusting. What's more—he expects the same good service for another repair-free season, perhaps two seasons!

This Thomas pump performance is no accident. The same thing is happening all over the Country, wherever Thomas pumps are used in production of sand and gravel—BECAUSE Thomas pumps are specially designed for high production efficiency and made of Genuine Thomas Ni-Hard Alloy for high resistance to abrasion. "YOU CANNOT BUY AT ANY PRICE A MORE DURABLE PUMP FOR SAND AND GRAVEL—YOU CANNOT BUY ANOTHER PUMP THAT WILL MAKE YOU AS MUCH MONEY."

Thomas Durable Dredge Pumps are manufactured in range of sizes from 6" to 16" discharge. Write or phone for additional information.

THOMAS FOUNDRIES Inc.

P. O. BOX 1111, BIRMINGHAM, ALABAMA

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

A PACKING RECOMMENDATION CHART, prepared by the Packing Division, *Raybestos-Manhattan, Incorporated,* gives, by specific applications, the proper packing types to use. The chart, on stiff paper stock suitable for posting, suggests seven basic packing types for 95 percent of all packing needs, including such applications as pumps and valves, compressors, and hydraulic and pneumatic equipment. (301)

UNITIZATION FOR MATERIAL-HANDLING, from the time the raw material enters the plant until the finished product leaves the plant is explained in an 18-page copy of one of two talks made by John H. Bates, industrial engineer at *Allis-Chalmers Manufacturing Company,* at the A.S.M.E. National Production Engineering Conference at Milwaukee, in May. Cost reduction through unitization, the other talk made by Mr. Bates at the same time, has been reproduced in a 12-page booklet. Both are available from Allis-Chalmers. (302)

"NICKEL ALLOY STEELS and Other Nickel Alloys in Engineering Construction Machinery," an illustrated 37-page booklet has been issued by the *International Nickel Company, Incorporated.* It deals with the properties of materials. power components, motive units, and machinery. (303)

FORD TRACTORS and industrial equipment for construction operations are described in an illustrated brochure published by the Tractor and Implement Division of the *Ford Motor Company.* Backhoes, dozers, Earth-cavators, fork lifts, cranes, and other industrial units are shown in use with Ford tractors in such applications as heavy and light excavating; heavy and light loading; scraping, leveling, and grading; and lifting, towing, and general utility. (304)

DRILLING SUPPLIES manufactured by the *Gardner-Denver Company* are described in three bulletins. Tungsten carbide insert bits, ranging in size from 4¾ in. to 8 in. in diameter are described in Bulletin 6-6HH. Bulletin 6-6gg explains the 6-in. diam. Mole-Dril, Model AM5A. A bit grinder that custom grinds at the job site is described in Bulletin 6-6ii. (305)

EIGHT FACTORS IN SELECTING ARC WELDING electrodes are listed on a pocket-size card available free from *Hobart Brothers Company.* The card lists application information on all mild-steel arc-welding electrodes, and explains how to identify them according to American Welding Society-American Society for Testing Metals classification. Also available free from Hobart is a sound color film, "Arc Welding Electrode Selection." Accompanying the film for distribution to the viewers is a folders that gives excerpts from the film. (306)

GETTING CLEAN, CLOSELY SIZED MATERIAL at low cost by using a portable conveyor-screening plant is explained in a folder released by *Lippman Engineering Works, Incorporated.* (307)

SPECIFICATION STEEL CASTINGS, including mutiple parts cast as one, are described and illustrated in a folder released by *Farrell-Cheek Steel Company.* Other units, such as wheels, rollers, and idlers; wire-rope fittings and sheaves; conveying and elevating equipment; gears and pinions; and bar benders and cutters are included. (308)

ROTARY LIME SLUDGE KILN MAINTENANCE is covered in a 16-page bulletin released by the *Traylor Engineering and Manufacturing Division* of *Fuller Company.* One half the illustrated booklet is given to kiln operation, and the other to preventive maintenance. (309)

THE OMEGA TABLE FEEDER for accurate feeding of dry compounds at low rates is described in a 4-page bulletin available from *B-I-F Industries.* Details of the operation, feed range, and capacity are given for the 5-cu. ft. hopper-capacity unit. (310)

AUGUST **PIT AND QUARRY** **1960**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

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RE-BABBITTING WITH CARBONITE AND NICKELITE babbitt metals is explained in an 8-page booklet, available from *Carbonite Metal Company.* **(311)**

"TAILORED TORQUE," a brochure published by *Warner Electric Brake & Clutch Company,* explains the Warner Electric principle of motion control. It also describes several clutch, brake, and clutch-brake applications, outlines specific operating advantages, and includes torque ratings and package dimensions for the complete line. **(312)**

THRUST BEARINGS WITH 30 PER-CENT greater load capacity are listed in a 28-page catalog released by *Rollway Bearing Company.* Diagrams illustrate ten types of cylindrical, roller-precision, thrust bearings; and photos, diagrams, and specifications give details by classified types. The retainers for the bearings are made of a specially developed ferrous material, Rollube, which inhibits the tendency for surface "welding" between the roller and the retainer pocket. **(313)**

ELECTRIC CONTROL SYSTEM, Metro-type Information system, and analog computing system cabinets available from *Bailey Meter Company* are illustrated in 2-page Product Specification Sheet G71-6. Details of construction, wiring, and dimensions are included. **(314)**

"THE FIRST FEW FEET," a 12-page 2-color booklet released by *Caterpillar Tractor Company,* outlines the job capacities of the new series of Caterpillar-built tractors, motor graders, and Traxcavators. **(315)**

HAMMERMILL SELECTION DATA is detailed in Bulletin 307, available from *Universal Engineering Corporation.* The specification sheet gives horsepower, feed openings, and weight, and lists the three types of hammers and the various grate combinations to give close product control for lime dust and road rock. **(316)**

"DRILLING ROCK WITH COUPLED STEELS," an 8-page illustrated brochure available from *Thor Power Tool Company,* details proper operational and maintenance procedures for coupled rock drill steels. Controls, feed practices, and lubrication practices are given. Step-by-step instructions for starting a hole are also given. Adding steels, removing a string of steels, and removing broken steels or couplings are discussed. **(317)**

A. C. MULTI-SHIELDED MOTORS made by *Sterling Electric Motors, Incorporated,* are described and illustrated in a comprehensive, 56-page catalog. Selection data is given for various special applications, including high altitude work. Drip-proof and explosion-proof motors, ranging in capacities from ¼ to to 200 horsepower, are detailed. **(318)**

CONVEYOR SCALE SYSTEMS FOR FLOW RATE CONTROL and total throughput measurement of bulk materials are explained in 4-page Bulletin 60, published by *Weighing & Control Components, Incorporated.* W-C conveyor scale systems used with flat-bed or trough-type conveyor-line systems of fixed or variable speed provide in-motion weight measurement to control processing and formulating operations. **(319)**

MAGNETIC PULLEYS AND PLATE MAGNETS for removing tramp iron are described in two bulletins available from *Eriez Manufacturing Company.* The pulleys are offered in a wide variety of combinations of magnetic strength, diameter, and belt width, and of either radial or axial design. Seventeen models of plate magnets, for use with chutes, screens, and conveyors, are explained in the other bulletin. **(320)**

Material listed here
is FREE
unless otherwise noted.

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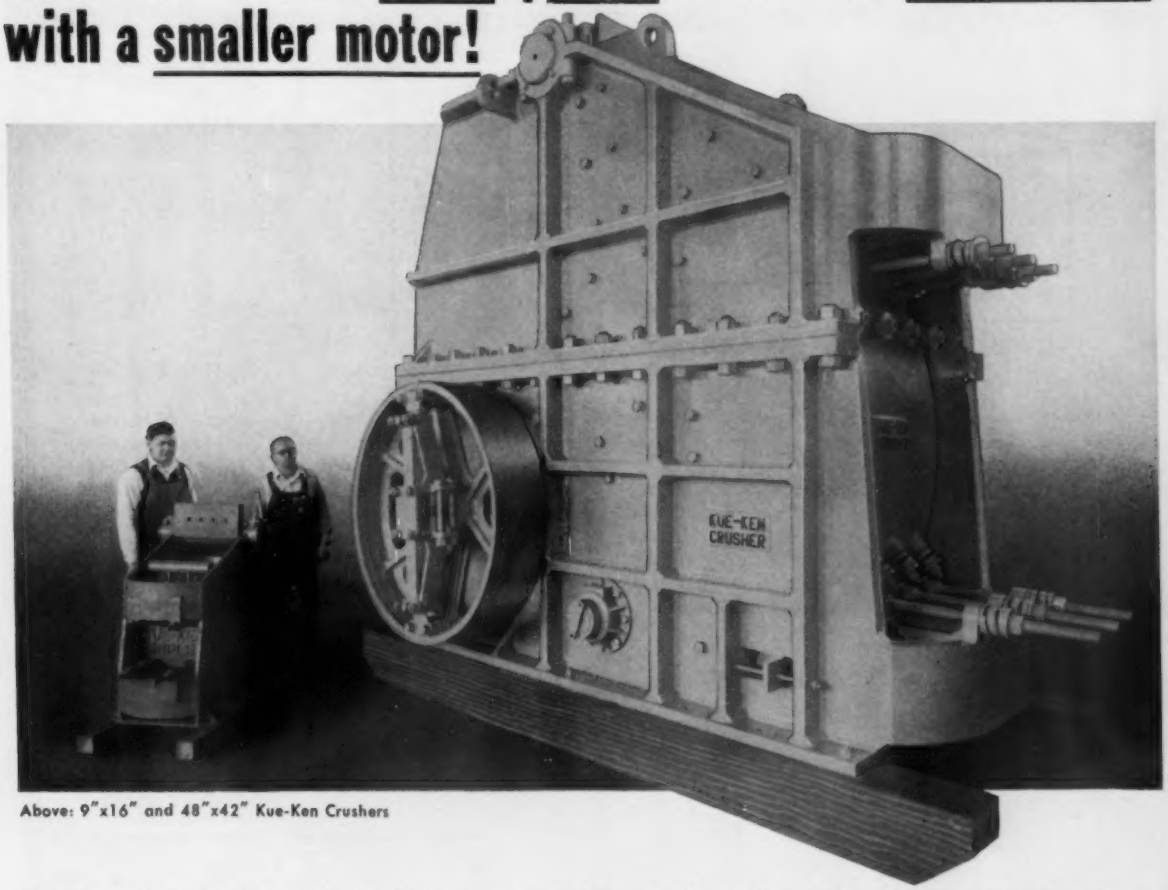
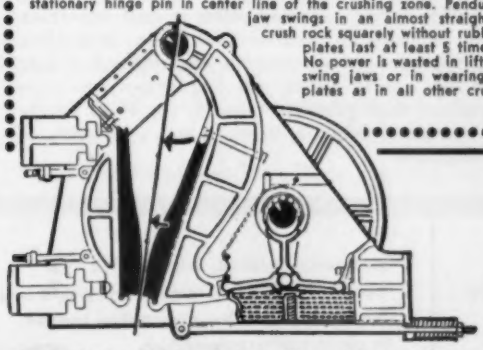
*U. S., U. S. Possessions, and Canada only.
Pan American countries, $10 a year; elsewhere, $15 a year.

KUE-KEN® has more power to crush more rock with a smaller motor!



Above: 9"x16" and 48"x42" Kue-Ken Crushers

Kue-Ken converts horsepower into crushing power more than any other crusher. With no heavy reciprocating parts to lift, Kue-Ken runs at higher speed for greater capacity and a more uniform product. Kue-Ken reduces the usual power-robbing wear and friction to the absolute minimum by sealing its precision machined toggle mechanism in a filtered oil bath. More power is available for crushing rock. Kue-Ken does not require heavy flywheels. A single lightweight flywheel permits the use of normal duty squirrel cage motors. Kue-Ken patented tramp iron release eliminates shearing or breaking parts. The simple, adjustable safety release integral with the flywheel automatically disengages on tramp iron. Quickly reset, crusher resumes production in minutes. Kue-Ken is the only crusher specially designed to minimize downtime and maintenance and to eliminate the major causes of power loss. In 33 sizes from 12" x 7" to 48" x 48", Kue-Ken provides the lowest cost-per-ton crushing.



KUE-KEN MAXIMUM LEVERAGE AT TOP OF SWING JAW permits crushing large rocks with small motor. Swing jaw is supported on the stationary hinge pin in center line of the crushing zone. Pendulum type jaw swings in an almost straight line to crush rock squarely without rubbing. Jaw plates last at least 5 times longer. No power is wasted in lifting heavy swing jaws or in wearing out jaw plates as in all other crushers.

KUE-KEN® CRUSHERS

"CRUSHING without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

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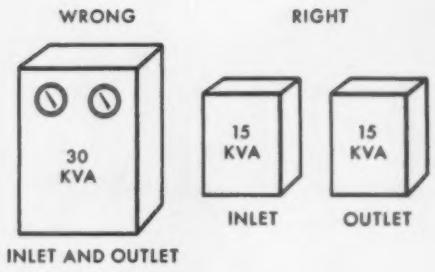
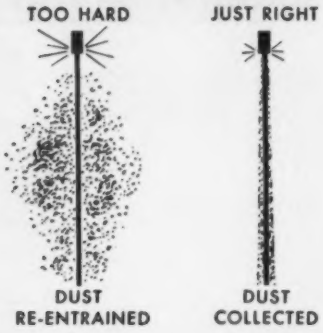
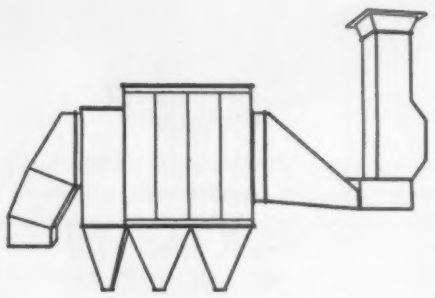
How to Evaluate Cottrell Precipitators



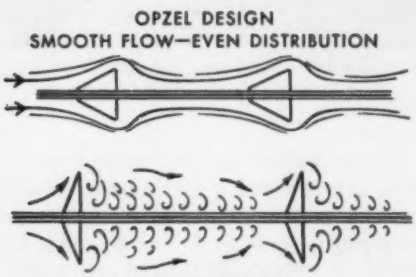
1. Electrical Sets should be arranged and rated to suit best the requirements of a specific job. Since electrical conditions can vary widely at different parts of the precipitator, it is good design to include several electrical sections in series, energized from separate sets so that each section may be energized as needed. Sets should be sized according to the amount of power the precipitator can absorb. A large excess of installed power, which will never be absorbed, means inefficient use of its equipment.



3. Rapping Intensity. Rappers should have easy means to vary the intensity of the blow to suit variations in operating conditions. A pre-set intensity setting cannot possibly give proper rapping over the normal range of operation. If too soft, build-up will occur which will disturb electrical conditions. If too hard, there will be reentrainment. Means of intensity adjustment are necessary to avoid drop-off of precipitator efficiency as conditions change.


3 DIMENSION MODEL

2. Gas Distribution. Remember that gas distribution, gas baffling, and provision against hopper sweeping all have a large influence on collection efficiency. The gas flow system should be analyzed as closely as possible, both in the precipitator and in the associated duct-work. If in doubt, have a three-dimensional gas flow study made. Two-dimensional gas flow studies *are not as accurate* and may lead to erroneous conclusions.



4. Baffle Design. Careful attention to the design of baffles on the collecting plates is most important. Small amounts of reentrainment mean tremendous differences in over-all collection efficiencies. It is seen that the "quality" of the collecting surface is far more important than quantity—quantity (sq. ft. of surface or treatment time) in itself is not a criterion of performance.

The point of all this is that so many factors enter into evaluating an electrical precipitator that you should consult with the leading manufacturer—Research-Cottrell

Research-Cottrell, with over 1198 years of combined engineering skill and experience, is the undisputed leader in electrical precipitation.

Research-Cottrell

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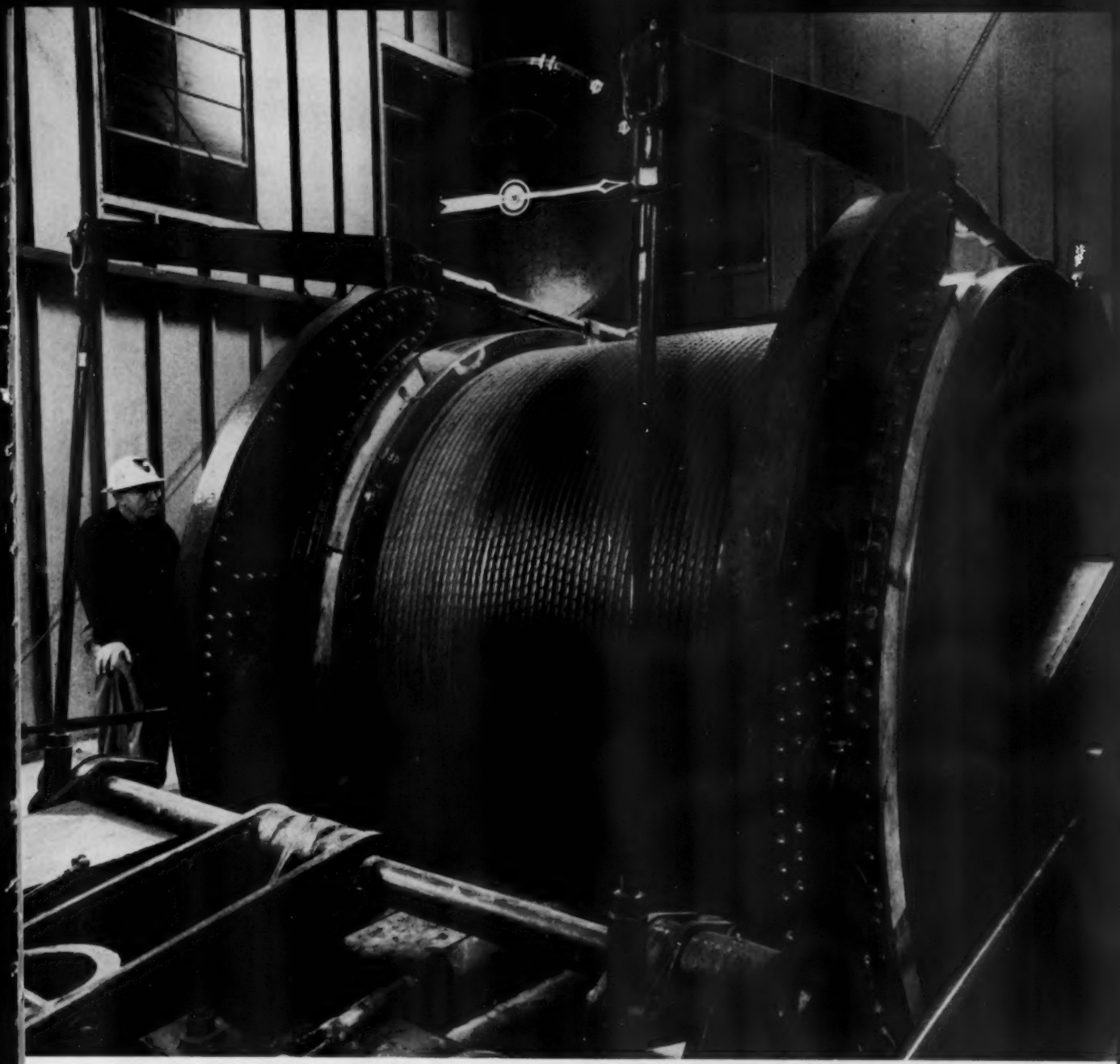

Bethlehem Rope Gets Workout in Mine Shaft. Here's a drum of wire rope that's giving a good account of itself. It's a 1½-in. Bethlehem line, photographed after it had experienced strenuous service for several months in a 19-ft-diameter shaft in a mid-continent mine. As you can see, the rope appears to be in excellent condition.

You'll find Bethlehem Wire Rope a willing worker in scores of applications in and about the mine. It's as dependable as the day is long, and can be counted on to lift tremendous tonnages.

Bethlehem Steel Company, Bethlehem, Pa. *Export Distributor:* Bethlehem Steel Export Corporation

Wire rope mill depots and distributors from coast to coast stock Bethlehem Rope

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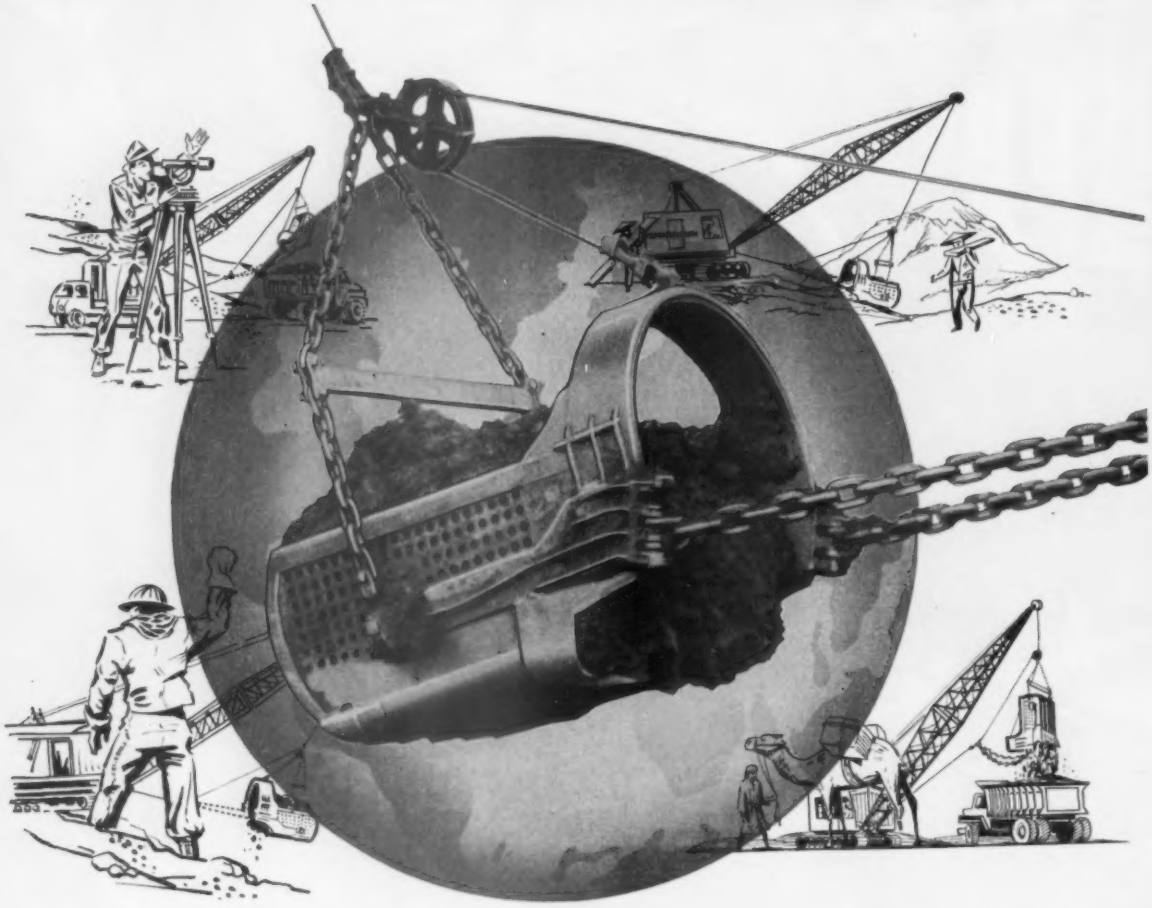

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IF YOUR CRAWLERS HAVE "CLASH BOXES" BETTER CHECK THE ADVANTAGES OF THE "EUC" C-6

Without full-power shift even a "brand new" tractor is an obsolete machine in performance and work-ability when compared with the new Euclid C-6 crawler. For the fast response and all-around versatility that's needed in mines, quarries, construction and industrial work, no other tractor has all the advantages you get in the C-6.

Proven Torqmatic Drive provides full-power shift and instant reverse without delay for clutching and shifting . . . with a flick of the wrist you change direction or from one speed range to another. It's the same easy-to-operate power train that has proved its dependable service in thousands of other earthmovers.

Get the facts on how the C-6 can cut costs on your jobs . . . from dozing and ripping to push-loading big scrapers. You'll find the many operating advantages of this modern tractor will bring you a better return on your investment.

EUCLID DIVISION OF GENERAL MOTORS, CORP., CLEVELAND 17, OHIO

DOZING and RIPPING **. . . plenty of power, easy operation and good stability make the C-6 tops for work in rough going and heavy material.**

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

WEAR CAN BE DANGEROUS!

Warns Miss Southern Tire

A stitch in time is important, but a retread in time can save a lot more money. Why risk costly downtime with "Do it yourself" tire maintenance? Let Southern Tire experts provide on-site inspection, pick-up and delivery of your giant tires.

Southern Tire's superior equipment and experience in the giant tire retreading field assure you *more* UPTIME, with a WIDER MARGIN of SAFETY at MINIMUM COSTS.

Southern Tire Retreading provides a wide selection of tread designs and sizes, too.

Rock Service • Traction Types

Rib Treads from 1100 x 24 to 33.5 x 33.

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SHEFFIELD, ALA.
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Enter 152-A on card, page 145

Reline coolers, firing hoods FASTER with DFC Monolithic Linings

DFC Plastic Fire Brick

There's a DFC Plastic Fire Brick for nearly every application. PX 33, Super PX 33 can be rammed or pounded into place — cutting expensive special shapes and installation cost. DFC plastics fire in regular operation to form monolithic lining. Also available in air-bond types.

DF 0-19

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FOR FULL INFORMATION, MAIL THIS COUPON TODAY

DFC Castable Refractories: Hi-Cast 24, temperature range to 2400° F.; Hi-Cast 28, from 1800° to 2800° F.; Super Hi-Cast, for use at elevated temperatures beyond ordinary ranges; Hi-Cast AR, extra high strength and abrasion resistance, and temperature range up to 2750° F. Immediate delivery from stock.

Enter 152-B on card, page 145

Enter 153 on card, page 145 →

USS Tiger Brand hoist ropes and boom supports help keep this 25-yard dragline on the job around the clock.

USS Tiger Brand hoist ropes
last over 1,800 hours on 25-yard dragline

This big dragline works around the clock—three shifts a day—at the Harmattan Mine of Fairview Collieries Corporation, Danville, Illinois. The twin hoist ropes last over 1,800 hours in this rugged service.

The USS Tiger Brand hoist ropes are two inches in diameter and 450 feet long. They are made of tough Monitor steel which has a reputation for long service on jobs like this.

The upper boom supports are also Tiger Brand—six two-inch diameter galvanized boom support strands 118 feet long. These are noted for their strength and resistance to vibration fatigue. Most of the largest shovels in the country are equipped with USS Tiger Brand Boom Support Assemblies because of their reputation for safety and long service life.

Why USS Tiger Brand is your best buy. Tiger Brand Wire Rope is designed by one of the industry's most capable staffs of wire rope engineers. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry. When you buy Tiger Brand you get the right rope for the job. And your installation is no further away than a phone call to experienced American Steel & Wire field service representatives.

You can get Tiger Brand Wire Rope for any type of mining service. For information, write American Steel & Wire, Dept. 0306, 614 Superior Ave., N.W., Cleveland 13, Ohio.

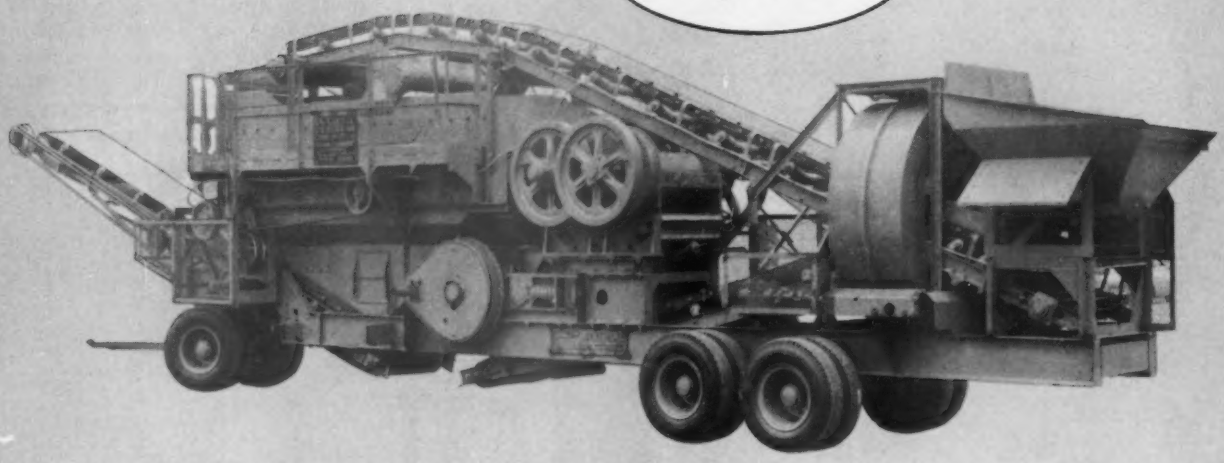
USS and Tiger Brand are registered trademarks

American Steel & Wire Division of United States Steel

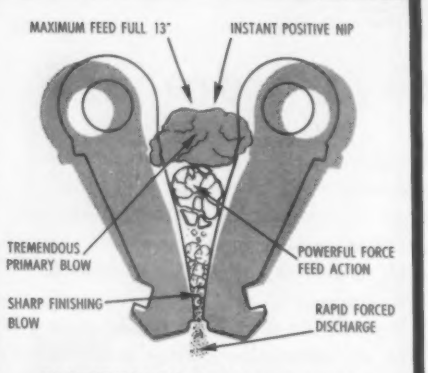
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors
United States Steel Export Company, Distributors Abroad

This mark tells you a product is made of modern, dependable Steel.

another
UNIVERSAL SYSTEMIZED
plant



Universal's new Giant Gravelmaster is systemized to handle BIGGER PRIMARY CAPACITY



BIG PRIMARY CAPACITY WITH UNIVERSAL'S NEW MATCHED JAW

Feeds faster, crushes faster, discharges faster. Synchronized Matched Jaws move at high speed, are longer, nip instantly, crush without belching or rebounding, force feed as they crush for bigger primary crushing capacity.

Universal's systemized engineering gives you a new Giant Gravelmaster plant with all components carefully balanced to keep up with the tremendous output of the new Matched Jaw Primary Crusher. These jaws with their high velocity, dual crushing action force material through discharge in tremendous volume. They crush closer to final product sizes — cut down on re-circulating loads, take pressure off secondary equipment.

Big Universal Roll Crusher gives you the greatest secondary crushing capacity ever offered in a plant of this type.

It's 30" x 26", with feed designed to make full use of 26" rolls — gives you top crushing output even in pits with high percentage of secondary material.

Snappy, Aggressive Screening that quickly cuts wet or damp material, prevents blinding or blanketing, and produces tremendous volumes of graded material at lower cost is a feature of the Screenmaster Horizontal Screen. The Screenmaster's exclusive air springs and rubber bushed phasing bars are responsible for its snappy controlled action and high volume screening.

Fast-moving extra wide conveyors are systemized in the Giant Gravelmaster to handle big primary and secondary capacity.

More tons per hour — more profit!

Each component of the big, new, powerful, portable Universal Giant Gravelmaster is engineered and built to deliver maximum capacity . . . the entire plant is systemized (each component carefully engineered to work together for peak efficiency) to give you more tons per hour, more profit from your operation. See your Universal distributor for complete facts.

PETTIBONE
UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

619 C Avenue N.W., Cedar Rapids, Iowa

A subsidiary of Pettibone-Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

This mark tells you a product is made of modern, dependable Steel.

Manufacturers' News

Announcement has been made of three executive promotions at Fuller Company, Catasauqua, Pa., a subsidiary of General American Transportation Corporation, Chicago, Ill.

C. C. Kaesemeyer

C. C. KAESEMEYER, former general sales manager was appointed executive vice-president, sales; DONALD S. DOUGLASS, former assistant general sales manager, to vice-president,

D. S. Douglass

J. L. Prather

division sales coordination; and JACK L. PRATHER, former patent attorney and legal counsel at Fuller, to assistant to the president.

Mr. Kaesemeyer, who held his previous post with Fuller for the past nine years, has served successively in Fuller's engineering, service, and sales departments. Mr. Douglass served as assistant general sales manager for the last two years. The company reports his new duties will include the coordination of Fuller with its Traylor Engineering & Manufacturing Division, and its Dracco Division—mainly in sales to the cement industry. Mr. Prather was a patent examiner in the United States Patent Office prior to joining Fuller.

E. ALLAN HOPPENSTEDT has been appointed sales manager of the International Division of Hewitt-Robins Incorporated. He was formerly manager of the International Division of Fischer and Porter Company. In his new position, he will work under the direction of JOHN J. SHEEHAN, general manager of the Hewitt-Robins International Division, and will be responsible for export sales, as well as sales for affiliated companies in Belgium, France, Holland, Italy, Great Britain, South Africa, Japan, Germany, and Brazil.

WILLIAM M. KINCH has been appointed as sales engineer in the Rock Products Chemicals Department of Dewey and Almy Chemical Division, W. R. Grace & Co., Cambridge, Mass. Mr. Kinch was formerly with Barnes Engineering Company, Inc., Auburndale, Mass.

RAY C. CONNER, general manager of the Mobile Hydraulics Division, Vickers Incorporated, was recently elected a vice-president of the company. Mr. Conner joined Vickers in 1948. After serving in various engineering and sales capacities, he was appointed general manager of the Mobile Hydraulics Division in 1957 when the division was formed.

The Ohio Locomotive Crane Company, Bucyrus, Ohio, has acquired the entire locomotive crane business of The Wellman Engineering Company, Cleveland, Ohio.

Effective June 15, the transaction involves both the Wellman diesel electric locomotive crane, introduced in 1956, and the former Browning mechanical locomotive crane which Wellman had manufactured since 1954. Ohio reports that it is now set up to furnish parts and service to Wellman and Browning owners.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal —no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300% —special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

• Open Gears, Dipper Sticks, Cams • Enclosed Gear Cases • Wire Rope and Cable
• Hydraulic Units, Torque Converters • Roller, Ball, and Sleeve Bearings • Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Enter 155 on card, page 145

← Enter 154 on card, page 145

The Farrell-Cheek Steel Company, Sandusky, Ohio, observed its fiftieth anniversary in May.

The company, a producer of alloy and carbon steel castings, began operations in 1910 with 10,000 sq. ft. and 20 employees. The company now employs 440 employees in buildings enclosing 250,000 sq. ft.

Farrell-Cheek won an Army-Navy "E" and three stars in World War II. Products of the company are included on the nuclear submarine Polaris, and the Thor missile.

LEE WOHLUST has been named sales manager of the Orlando, Fla., branch, Linder Industrial Machinery Company. Prior to joining the Linder organization, he was associated with Llewellyn Machinery Corporation for four years.

At Linder Machinery, he will be concerned primarily with Michigan rubber-tired earthmoving equipment. Complete parts and service facilities are maintained at the Orlando branch.

ADRIAN BRUINS, Boulder, Colo., has been appointed agent to handle the sales of gas scrubbers, coolers, and absorbers for Colorado and Wyoming for Peabody Engineering Corporation, New York, N. Y.

The appointment of R. R. WORTHINGTON as assistant general manager, Bagpak Division, International Paper Company, New York, N. Y., has been announced.

Mr. Worthington, who joined International Paper as a chemist in 1934, has been a member of the Bagpak sales staff since 1936. He was appointed divisional sales manager in 1954.

Succeeding Mr. Worthington as sales manager is R. A. GAIR JR. Mr. Gair joined the division in 1949 as an apprentice salesman. He was named West Coast district sales manager in 1955.

C. H. CRAIN, who joined the company on 1948, also as an apprentice salesman, has been named to replace Mr. Gair as West Coast regional district sales manager.

Dominion Brake Shoe Company, Montreal, Quebec, has elected HOWARD M. BROWNRIGG and JOHN A. MCVICKER as vice-presidents of the company. In his new post, Mr. Brownrigg will be in general charge of steel foundry products. After experience in the Canadian foundry industry, he joined the Joliette Steel Division of Dominion Brake Shoe in 1950 as assistant works manager. He became works manager in 1951, and in 1957 was appointed vice-president of manufacturing of both Joliette Steel Division and Manitoba Steel Foundry Division.

Mr. McVicker joined American Brake Shoe Company in 1934. Serving in sales and production capacities, he was named assistant general superintendent of the firm's old Niagara Falls, N. Y., plant in 1939. In 1946 he was named assistant works manager for the Canadian Ramapo Division of Dominion Brake Shoe becoming superintendent in 1950, and vice-president of the Division in 1956. In his new position, Mr. McVicker will move to Dominion Brake Shoe's headquarters in Montreal.

W. R. TIMKEN has been elected president of The Timken Roller Bearing Company. He succeeds D. A. BESSMER, who resigned. Elected to the board of directors were G. L. DEAL, secretary-treasurer of the company; P. J. REEVES, vice-president in charge of sales, and HENRY TOBEY, vice-president in charge of manufacturing, Bearing and Rock Bit Divisions.

The W. S. Tyler Company, Cleveland, Ohio, has announced the creation of two separate marketing divisions, Woven Wire Cloth and Screening Machinery. ALBERT E. REED, vice-president, marketing, will be responsible for setting the sales and pricing policies of both divisions.

The appointment of F. TRUMAN THOMPSON, sales manager of the new Woven Wire Cloth Division, and WALTER C. MAHLIG, assistant sales manager of the same division, was announced at the same time.

IAN D. RITSON has been appointed to the newly created post of director of construction of Olin Mathieson Chemical Corporation. He is responsible for reviewing all construction programs and progress for the corporation and its divisions and for developing standards and techniques of construction cost control. For the five years prior to his new appointment, Mr. Ritson was project manager for Perini Ltd. in Toronto, Canada, a subsidiary of the Perini Corporation, Boston, Mass.

I. D. Ritson

W. Solarz

Rankin Manufacturing Company, Alhambra, Calif., has announced the appointment of WILLIAM SOLARZ as manager of the northeastern district. Ranite and Ranomatic hardsurfacing materials are sold in the area through authorized distributors servicing eastern Canada, New England States, New York, Michigan, and Ohio.

Mr. Solarz has taken over his new duties which include consultation and direct field assistance for customers hardsurfacing applications. He will headquarter in Cleveland, Ohio.

JOSEPH EPSTEIN has been appointed vice-president in charge of manufacturing and engineering of The Patterson Foundry and Machine Company, East Liverpool, Ohio.

Leschen Wire Rope Division, H. K. Porter Company, Inc., has opened a district office and warehouse in Oklahoma City, Okla. The new facility is at 216 South Klein Street. The office will serve as headquarters for the Midwest sales district with HUGH BERGIN, district sales manager in charge.

HEIL-TEC dump trailers

Exclusive design cuts dead weight...lets you haul up to 4,000 lb more payload

HY-SPILL dump trailers increase the versatility of your hauling rig. *Exclusive, patented design* holds front tandem wheels on ground during dumping, provides 38 to 40-in. spill height from end of body floor to ground. Clearance is ample for high stockpiling, dumping into above-ground hoppers and paving and spreading machines.

Exclusive design of TEC frameless dump trailers—engineered for maximum strength and stability with minimum tare weight—saves 1,000 to 2,000 lb per unit compared to conventional frame-type trailers. TEC frameless dump trailers can be furnished in long lengths to permit forward location of lower fifth wheel on tractor, and also obtain long extreme axle spacing as required in many states. *Payload can be increased as much as 4,000 lb* in certain states . . . and even more where longer axle spacing is desirable.

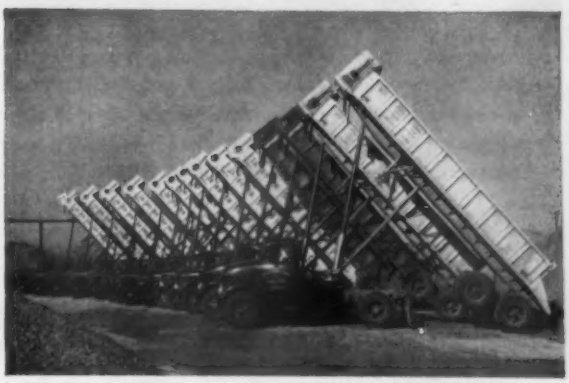
Aluminum boosts payload

With aluminum construction, you can haul an extra 2,400 to 3,000-lb payload. Weight-saving HY-TEC and HY-SPILL design and aluminum construction actually can soon pay for itself in increased income.

TEC builds single axle and tandem semi-trailers for use with either single axle or tandem tractors. Single axle trailers are available in body lengths from 16 to 28 ft, and tandem axle units in lengths from 20 to 34 ft.

TEC design gives you on-the-job advantages

- **Exclusive HY-SPILL design permits dumping into high hoppers, paving and spreading machines.**
- **Body can be raised or lowered while moving, with better stability than any other hauling unit.**
- **Trailer can be dumped while jackknifed, speeds dumping and turn-around in tight places.**
- **Excellent balance and maximum stability let you haul and dump safely and efficiently on rugged job sites and off-highway conditions . . . anywhere your truck can go.**



Fleet of HY-TEC dump trailers operated by a large Midwestern sand and gravel producer. First two units in foreground are aluminum.

HY-TEC FRAMELESS TYPE
U.S. Patent No. 2,846,267

HY-SPILL FRAMELESS TYPE
(Available Only From Heil)
U.S. Patent No. 2,853,341

TEC Division

THE HEIL CO.

DUMP BODIES and HOISTS

TEC Division, 1285 West 70th Street, Cleveland 2, Ohio

News Reports from Operators Reveal Stamina of SECO Twin Bearing Screens

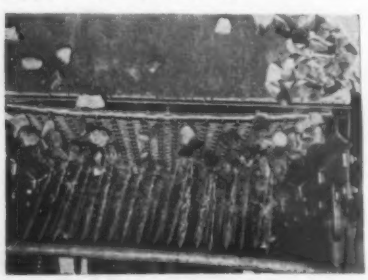
Now, you can expect and get a new kind of stout-hearted performance from 2-bearing screens.

That is, if they are SECO TWIN BEARING screens. Yes, actual results, reported to us by producers themselves, give strong proof that SECO design and engineering superiority really pay off . . . day after day, year after year where it counts . . . on the job. Today, with your own profits so dependent on operational efficiency, we believe it will pay you to get the full information about SECO TWIN BEARING screens.

"Over 1,000,000 tons without a whimper from our SECO TWIN BEARING screens" reports Jules Koczat of Buffalo Crushed Stone Corporation. "We've screened eight sizes of aggregate for 1½ years without a minute of downtime. We are so pleased we now have seven SECO TWIN BEARING screens on the job."

"We like the action and performance of this screen." Joe Schwendt, Sup't., Amico Sand & Gravel Co., Riverside, N. Y.

"This screen is a real screener. Elmer is very happy with it, and says they will be ordering more of them in a month or so." R. P. Fulton, Southern Machinery & Supply Co., Roanoke, Va.



"This sieve analysis is a real endorsement for SECO TWIN BEARING screens." K. K. Kagarise, General Sup't., The Standard Slag Co., Youngstown, Ohio.

"Our SECO TWIN BEARING screens are doing a real good job of screening. Our only replacement has been screen cloth." Paul Padgett, Purchasing Agent, Thompson, Weinman & Company, Sylacauga, Alabama.

"I never believed a 2-bearing screen could perform like this." We're averaging 120 TPH in three sizes of gravel plus concrete sand . . . with no trouble at all on our 3 x 10 Triple Deck model." Eric A. Krehbiel, President, Clarence Sand and Gravel Corp., Clarence, New York.

SEND FOR BULLETIN TB-21

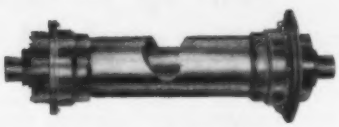
Designed for Volume Low Cost Screening

SAND • GRAVEL • CRUSHED STONE • CINDERS • SLAG and AG-LIME

Single, double, triple and half deck variations. May be suspension or base mounted.

RIGID BOX FRAME CONSTRUCTION

Eliminates body distortion thus preventing undue stress on shaft assembly.



20%-30% HEAVIER AND STRONGER SHAFT

The heart of the screen, precision built with an extra margin of safety and with extra heavy bearing, too!

OIL BATH BEARING LUBRICATION

Provides more thorough lubrication for longer bearing life. Special flinger type seals prevent oil entering the tube assembly.

SECO

"TIME CONSCIOUS" VIBRATING SCREENS

SCREEN EQUIPMENT CO., INC., BUFFALO 25, N. Y.

ROBERT B. BRADLEY has been elected vice-president and executive head of International Harvester Company's Construction Equipment

R. B. Bradley

H. T. Reishus

Division, located at Melrose Park, Ill., a suburb of Chicago. Joining the company in 1929, Mr. Bradley began as a salesman in the Oklahoma City district office, becoming zone manager three years later. Serving in positions of increasing responsibility at home and abroad, he was elected top executive of the Canadian company in 1954.

HARALD T. REISHUS has retired from the position now held by Mr. Bradley. Mr. Reishus started with Harvester in 1923, as a member of the Minot, N. D., district sales staff, and gained experience in various sales positions. When Harvester formed its Construction Equipment Division in 1944, Mr. Reishus was appointed general manager and executive head. He was elected vice-president in 1953.

Appointment of S. O. BRINGHURST as manager of the Salt Lake City Branch, Mine and Smelter Supply Company, has been announced. Mr. Bringhurst has been with the company for 30 years and has been serving as assistant branch manager. He succeeds WILLIAM J. BERRYMAN who has retired from active service after 43 years with the company. Mr. Berryman is being retained in a consulting capacity.

Roulunds Fabriker, Ltd., of Odense, Denmark, has been licensed to make the complete line of Dayton V-belts and other products for sale to "Outer Seven" countries, according to an announcement from Dayton Rubber International, a division of the Dayco Corporation.

Three men have received promotions at Atlas Copco, New York, N. Y.

MARTIN JAMES, former rock drill sales manager for Atlas Copco Eastern, Paramus, N. J., was appointed sales manager of the Mining and Construction Divisions of Atlas Copco Pacific. His headquarters will be San Carlos, Calif.

DAN J. GOODWIN, former northeast district manager for Atlas Copco Eastern, was named to replace Mr. James at Paramus. MICHAEL J. BREMNER, formerly sales representative in the Niagara Falls region, was appointed northeast district manager.

The appointment of M. L. Baxter Limited, Toronto, Ont., as distributor for its crushing, screening, and washing equipment has been announced by Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio. The territory covers the province of Ontario.

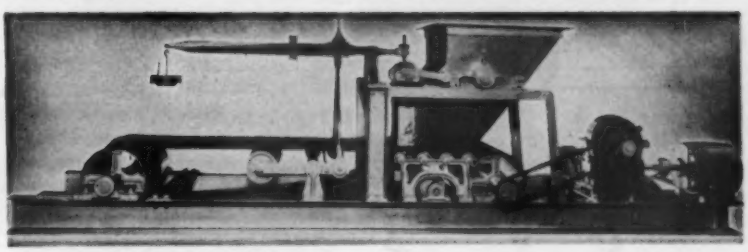
WILSON O. VAUGHN has been appointed manager of the Baltimore, Md., district of Allis-Chalmers Industries Group. Mr. Vaughn, who has been a sales representative in the Richmond district since 1951, succeeds G. H. CARDEN. Mr. Carden, who has been with Allis-Chalmers since 1930, has transferred to the Richmond district as a sales representative.

A contract to supply all the basic equipment for a new 3,000-bbl. plant of the Mindanao Portland Cement Company has been announced by officials of Fuller Company, a subsidiary of General American Transportation Corporation.

The contract, totaling approximately $2.5 million, draws upon Fuller's diversified facilities for the design and manufacture of virtually all key cement-producing equipment for the new plant, to be located at Iligan City, Mindanao, Philippine Islands.

FOR PEAK PROFITS IN '60

INSTALL A SCHAFFER POIDOMETER



Over 1600 of these SCALES NOW SERVING INDUSTRY

EXPERIENCED PROCESSORS of bulk materials will "vouch" for its scaling efficiency.

The high-speed, high-precision, automatic POIDOMETER is specially designed and built to assure uniform products on a high-economy output. Place this machine in your plant and see the unmatched service it performs under any condition.

The Schaffer Poidometer is available with remote control devices for showing and changing feed rate, and with total weight recorders.

Write for FREE catalog No. 5

SCHAFFER POIDOMETER CO.

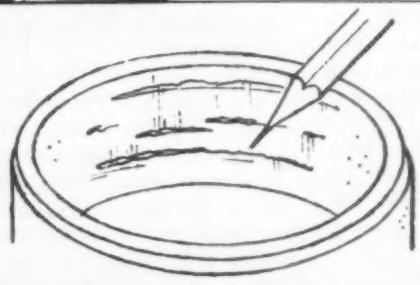
2828 Smallman Street **Pittsburgh 22, Pa.**

Enter 159 on card, page 145

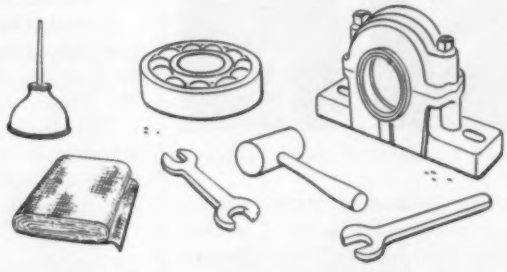
DISTRIBUTOR DAN the SKF bearing man, tells

WHAT DIRT DOES TO BEARINGS

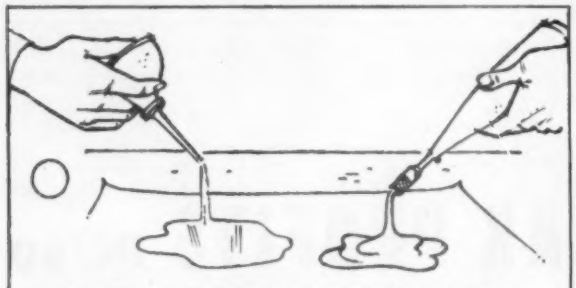
—and how you can help keep it out



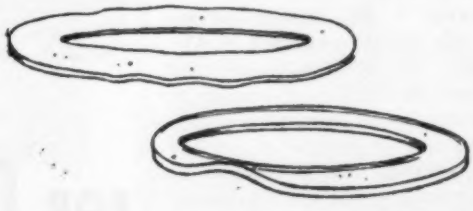
LOOK FOR POLISHED, CLEARLY-MARKED BALL OR ROLLER PATHS. They're sure signs that dirt is getting into your bearings, causing lapping of the parts and ultimate failures. To eliminate this problem, follow the steps shown here.



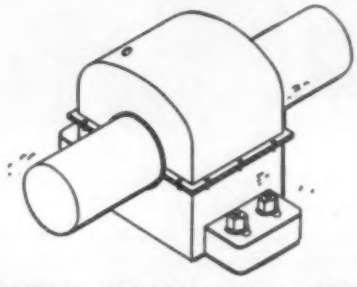
START WITH GOOD "HOUSEKEEPING." Work with clean tools in a clean area. Before you replace a bearing, clean the housing—both inside and out. Always handle a used bearing as carefully as you would handle a new one.



LOOK OVER YOUR LUBRICANTS AND LUBRICATING EQUIPMENT. Dirty oil and grease carry foreign matter with them, right into the bearing. So check them for cleanliness before you use them —and your grease guns and oil cans, too.



IS THE SEAL BENT OR WORN? If it is, dirt and dust and other foreign matter can get into the bearing. If moisture or water is present, you'll need seals made of special moisture-resistant materials.



WHERE DIRT IS A CONTINUAL PROBLEM, try shrouding the bearing housing in a metal box like the one shown here. It's inexpensive, easy to build and helps deflect dust and dirt away from the bearing.

Whenever you're baffled by a bearing problem, consult your Authorized SKF Distributor. His staff of experienced bearing specialists are always ready to serve you—and he stocks all types and sizes of the bearings you need, ready for immediate delivery.

SKF

AUTHORIZED DISTRIBUTOR

6006

Spherical, Cylindrical, Ball, "Timken" Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

*REG. U. S. PAT. OFF.

NOW! A SCREEN WITH A

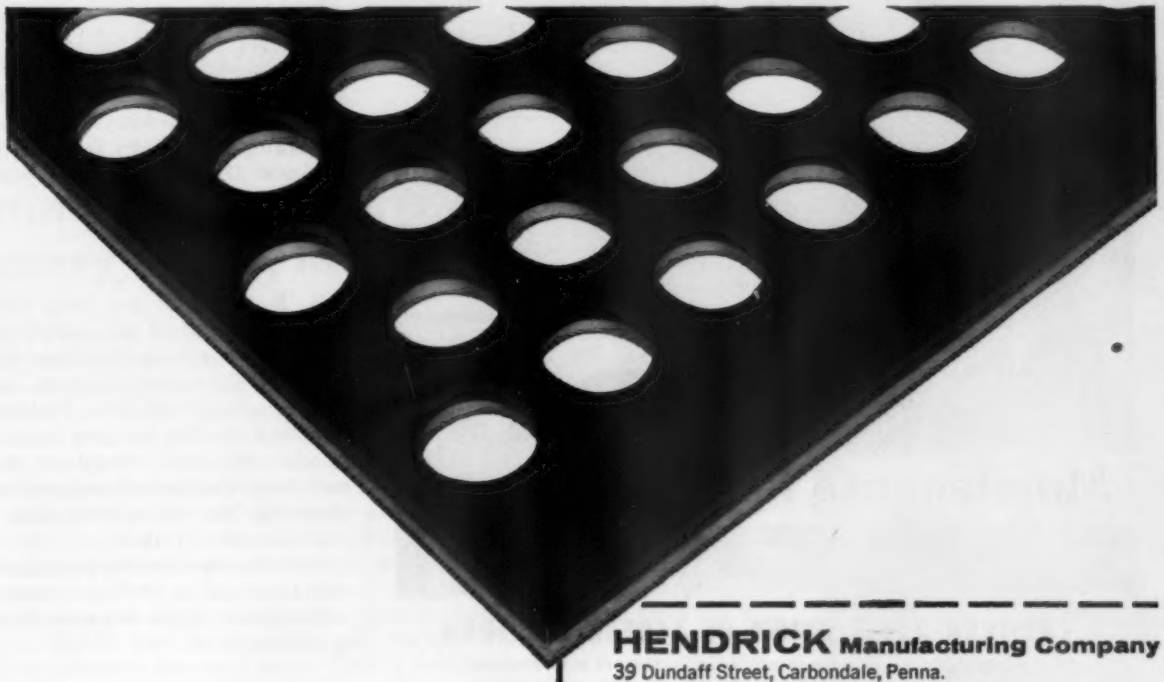
rubber bumper

HENDRICK RUBBER CLAD PERFORATED METAL is now available with a specially designed rubber covering. Ideal where extreme abrasion is a problem, rubber clad Hendrick Perforated Screens assure far less plate wear. Large chunks of ore, coal or stone hit the screen with a fully cushioned shock . . . the rubber coating also takes the brunt of wear by protecting the steel plate underneath. The rubber laminate is bonded to steel by a new adhesive and vulcanized under controlled heat.

For more details contact your local Hendrick representative or mail in the coupon direct.

HENDRICK Manufacturing Company
Carbondale, Pennsylvania

PERFORATED METAL SCREENS • WEDGE WIRE SCREENS • CASCADE WEDGE WIRE SCREENS
WEDGE SLOT SCREENS • RUBBER CLAD PERFORATED SCREENS • FLANGED LIP SCREENS
FLIGHTS • SHAKER AND CONVEYOR TROUGHS.



HENDRICK Manufacturing Company
39 Dundaff Street, Carbondale, Penna.

Gentlemen: I would like to learn more about Hendrick Rubber Clad Perforated Metal Screens.

☐ Please have representative call.
☐ Please send FREE literature.

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

Directors of The Flintkote Company, New York, N. Y., and of The Diamond Portland Cement Company, Middle Branch, Ohio, have approved a plan for a merger through an exchange of stock. The proposed merger is subject to approval of the stockholders of both companies at special meetings to be announced in the near future.

R. D. RAFF is scheduled to continue as president of Diamond Portland Cement which is planned to be operated as a Flintkote division. Heads of both companies state that no changes are contemplated in Diamond's management and personnel operations.

DONALD C. RIBLET has been promoted to manager of the Birmingham, Ala., district office for P&H construction and mining equipment manufactured by Harnischfeger Corporation, Milwaukee, Wis. This district now includes all of Alabama, middle and eastern Tennessee, and the western panhandle of Florida.

M. E. ZIEGENHAGEN has been appointed director of advertising and public relations of The Babcock and Wilcox Company. His experience in advertising and public relations spans 12 years of service with the General Electric Company and 8 years as manager of these activities with the Worthington Corporation.

Making his headquarters in the Babcock & Wilcox general offices in New York City, N. Y., Mr. Ziegenhagen will report to the vice-president in charge of the Staff division. He will be responsible at the corporate level for the direction and centralized coordination of advertising and publicity, and will serve all company divisions and subsidiaries in these functions.

H. B. DUKE, director of industrial relations; and MARK T. GILKINSON, manager of the industrial sales division, have been appointed to the board of management of the Gates Rubber Company, Denver, Colo.

The American Brake Shoe Company, New York, N. Y., has announced the formation of an industrial castings group composed of

P. L. McCulloch

W. D. Raddatz

four of the company's divisions. PAUL L. MCCULLOCH JR. was appointed group executive and has been elected a vice-president of the company. Mr. McCulloch now has over-all responsibility for the operations of the American Manganese Steel Division, Electro-Alloys Division, Engineered Castings Division, and the National Bearing Division, which operate 15 plants throughout the country.

Prior to his new position, Mr. McCulloch was president of the company's Electro-Alloys Division. Succeeding him in this position is WILLIAM D. RADDATZ, who was vice-president of the division.

B. R. PUTNAM has been appointed manager of the explosives and mining chemicals department of American Cyanamid Company. In his new assignment, Mr. Putnam will direct all of the company's commercial operations related to the marketing of explosives and mining chemicals. He will maintain headquarters in New York.

Mr. Putnam became associated with Cyanamid in 1947 as a chemical engineer at the Warners plant in Linden, N. J.

HOWARD W. LANGE has been promoted to manager of the western territory of Western Precipitation Division of Joy Manufacturing Company, Pittsburgh, Pa. Mr. Lange will be headquartered in San Francisco, Calif. He has served in the west for Western Precipitation for many years.

PROPER APPLICATION OF SCREEN SECTIONS

When installing a vibrating screen section, be sure it is centered and aligned. Take up tension from both sides of the vibrator to maintain centered position and keep hooked edges from deforming — exam circle above. Tension or pull must be horizontal to prevent whipping or slipping of screen sections. Check the application carefully. Call Cleveland Wire Cloth for valuable assistance and top quality vibrating screen section cloth.

Write for *FREE* maintenance-reducing check sheet today.

THE CLEVELAND WIRE CLOTH & MFG. CO.

3574 EAST 78th STREET CLEVELAND 5, OHIO

Enter 162 on card, page 145

Enter 163 on card, page 145 →

CALL THE MAN WHO

makes your conveyor dollar carry more, last longer

Here's how you can be sure of top conveyor efficiency and economy: include a CHAIN Belt Conveying Engineer on your planning team. He's well qualified in two ways to help your team find the right system for your specific needs: 1. He offers you the industry's most complete selection of belt conveyor components such as idlers, pulleys, bearings and take-ups—assuring the most efficient design for every application. 2. He's an application expert—offering you many years of experience in selecting the right conveyor system for the job.

As a result, you get top efficiency in your system and you save because you cut initial, operating and maintenance costs. You keep down time to a minimum with trouble-free operation and longer conveyor life. You move maximum tons at lowest cost.

Whether you are planning a new system or expanding existing units, call in your CHAIN Belt Conveying Engineer. He will help your planning team get better results. Contact your nearest CHAIN Belt District Office. Or write CHAIN Belt Company, 4604 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: CHAIN Belt (Canada) Ltd., 1181 Sheppard Ave. East, Toronto.

REX®

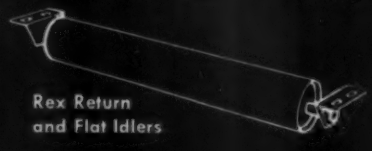
CONVEYOR SYSTEMS AND COMPONENTS

Another PLUS value...

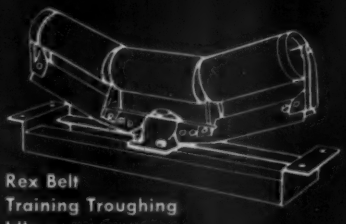
REX® Conveyor components

Complete line of idlers and pulleys Rex-Rated for every type of service

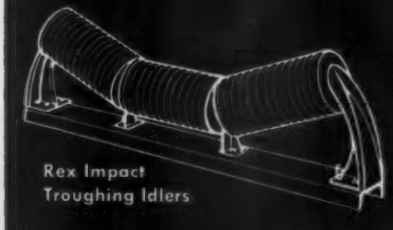
Rex Troughing Idlers



Rex Return and Flat Idlers

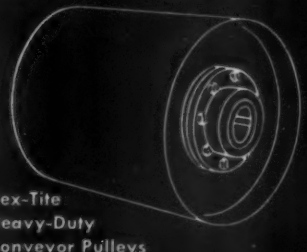


Rex Belt Training Troughing Idlers

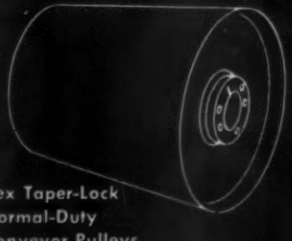


Rex Impact Troughing Idlers

Rex Spiral Return Idlers



Rex-Tite Heavy-Duty Conveyor Pulleys



Rex Taper-Lock Normal-Duty Conveyor Pulleys

engine power
BY CATERPILLAR

WHY YOU RARELY SEE SMOKE FROM EQUIPMENT REPOWERED WITH CAT ENGINES

Some diesel engines smoke almost all of the time. They can't help it. It's the way they're made. Diesel smoke can be a minor annoyance or a major headache, depending on the way the engine is used—and where it's used.

You rarely see smoke coming from the exhaust of equipment powered by Caterpillar Diesel Engines. This is because of the way they are designed. They are four-cycle engines and each has the exclusive Caterpillar adjustment-free individual fuel injection pumps and non-fouling single orifice injection valves. This system is simple, reliable and economical.

The large single orifice on the injector does not tend to build carbon deposits or foul. You can idle a Cat Diesel without racing it to keep it from stalling out. It will idle and accept a full load instantly and faultlessly. If it's ever necessary to change the injector capsule, you simply remove the injector, unscrew the capsule and screw in a new one, then replace the injector. Anyone can do it and it takes just a few minutes. You save on maintenance costs.

The Caterpillar precombustion chamber permits use of lower cost fuels. Even then, you'll rarely see smoke because of Caterpillar's highly efficient fuel system.

The superintendent of a water diversion tunnel project had this to say about a Plymouth locomotive powered with a Cat D326, "We can pull twice the load and not smoke up the tunnel." Performance of the Caterpillar-powered Plymouth was so outstanding, the company ordered another identical unit.

When you repower with a Cat Diesel, you save several thousand dollars a year on fuel alone, over the cost of, say, gasoline. You save on power maintenance because Cat Engines require infrequent care and are easy to care for. Service and genuine parts are available from your Caterpillar Dealer. The repowering installation is usually very simple and seldom takes your equipment out of action for much time. Compact Caterpillar Diesels put a lot of productive power in relatively little working space.

For new power or repowering, Caterpillar Diesel Engines are probably the most economical you can own. For a fraction of the cost of a new locomotive, repowering with Caterpillar can give you new equipment performance. Ask your Caterpillar Dealer for facts on repowering. He will give you a complete—and impressive—summary of the advantages to you. In the meantime, write for "Caterpillar Engines for Railroad Power" and for "Railroad Equipment Manufacturers' Machines Powered by Cat Diesels." Both will be sent free upon request.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

J. H. JONES has been appointed manager of The White Motor Company's St. Louis branch. He will be in charge of branch sales, parts, and service for White and Autocar trucks and tractors. For 10 years, Mr. Jones served as a retail salesman in White's St. Louis branch. He was transferred to the company's Cleveland headquarters in 1959 as assistant to the vice-president, sales.

J. H. Jones

J. L. Schumann

JACK L. SCHUMANN has been elected president and a director of Buell Engineering Company, Incorporated, producers of industrial dust and air pollution control equipment. He succeeds J. A. MCBRIDE, who will continue as a board member and consultant.

Mr. Schumann joined the Buell organization in 1946 as a sales engineer. Ten years later, he joined Vitro Engineering Company, and subsequently served as a vice-president.

L. V. CLARK has been appointed director of explosives research and development for American Cyanamid Company, New York, N. Y.

Mr. Clark will direct all explosives research and development projects from his headquarters at the company's explosives plant in New Castle, Pa., as well as directing the Cyanamid research center at Bound Brook, N. J., and at other locations. Prior to his new assignment, he had been manager of the New Castle plant for 13 years.

JOHN J. BROSKY has been appointed manager of American Cyanamid Company's explosives plant at New Castle, Pa., to succeed Mr. Clark. Mr. Brosky has been associated with Cyanamid's explosives department since 1947, when he joined the technical staff at New Castle as a development chemist.

Webster-Detroit Company, Southfield, Mich., has been appointed full line sales representative for the state of Michigan, for Hendrick Manufacturing Company, Carbondale, Pa.

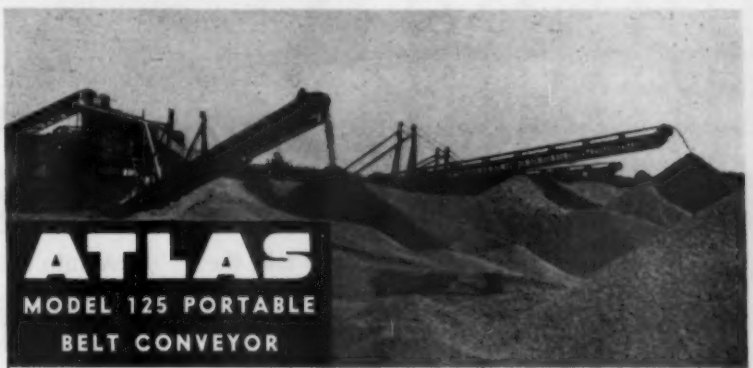
Appointment of LEON T. NEWMAN to the post of treasurer of the J. I. Case Company, Racine, Wis., has been announced. Mr. Newman succeeds WILLIAM B. PETERS, who will retire at the end of this year after 50 years of service with the company. Until that time Mr. Peters wil continue as vice-president.

The first license to produce castings of U. S. Steel Corporation's patented "T-1" constructional alloy steel has been issued to a Los Angeles, Calif., foundry. Alloy Steel & Metals Company will produce these castings in a range of products for a score or so of industries it serves throughout its primary market in 11 western states.

The Heil Company announces the appointment of JOSEPH A. WAITE to the position of assistant sales manager of the TEC Division, Cleveland, Ohio. Prior to this recent appointment, Mr. Waite was district sales representative for the company working from their Atlanta, Ga., office for 5½ years.

After 36 years of company service at The Okonite Company, wire and cable manufacturing subsidiary of Kennecott Copper Corporation, IGNACIO W. BORDA, vice-president and general sales manager, retired in June.

Until 1957, when he assumed responsibility for all of Okonite's field sales personnel and market specialists at the company headquarters at Passaic, N. J., Mr. Borda had served on the West Coast. Starting as a sales representative in the San Francisco office in 1924, he rose to the position of Pacific Coast manager in 1928 and was named a vice-president in 1929.



BIG OR SMALL . . .
THE MODEL 125 IS A GIANT FOR PERFORMANCE

This model is available in 25' to 70' lengths, with 18", 24" and 30" wide belts. ATLAS Model 125 Portables have earned a reputation everywhere for efficient and reliable materials handling operations with exceptional low operating and maintenance costs . . . the 125 is versatile in the type of job it can handle, such as loading trucks or stockpiling gravel (as shown above).

Write for Bulletin 125A.

When dependable conveying and loading equipment is needed, be wise — ask for Atlas.

Write Us for the Name of Your Nearest ATLAS Distributor.

ATLAS CONVEYOR CO., CLINTONVILLE, WISCONSIN, U.S.A.

Manufacturers of portable and stationary conveyors and bucket elevators for handling loose material such as sand, gravel, crushed stone, coal, coke, cement, etc.

Enter 165 on card, page 145

WHICH JOB WOULD YOU TAKE?

If you're like most of us, you'd take the job with the more tempting salary and the brighter future.

Many college teachers are faced with this kind of decision year after year. In fact, many of them are virtually bombarded with tempting offers from business and industry. And each year many of them, dedicated but discouraged, leave the campus for jobs that pay fair, competitive salaries.

Can you blame them?

These men are not opportunists. Most of them would do anything in their power to continue to teach. But with families to feed and clothe and educate, they just can't make a go of it. They are virtually *forced* into better paying fields.

In the face of this growing teacher shortage, college applications are expected to *double* within ten years.

At the rate we are going, we will soon have a very real crisis on our hands.

We *must* reverse this disastrous trend. You can help. Support the college of your choice today. Help it to expand its facilities and to pay teachers the salaries they deserve. Our whole future as a nation may depend on it.

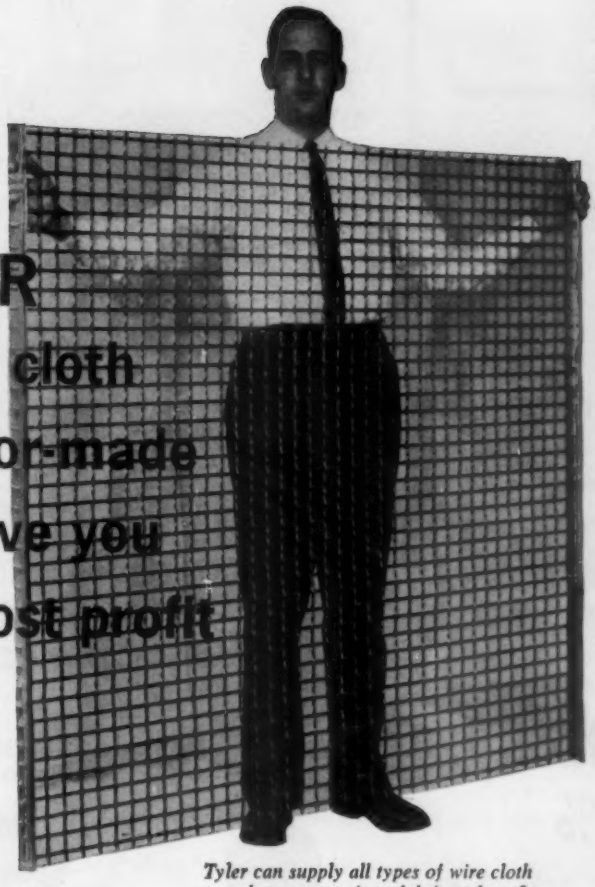
It's important for you to know more about what the impending college crisis means to you. Write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, N.Y.

ADVERTISING COUNCIL · PUBLIC SERVICE ·

Sponsored as a public service,
in co-operation with the Council for Financial Aid to Education

HIGHER EDUCATION
KEEP IT BRIGHT

TYLER wire cloth is tailor-made to give you the most profit

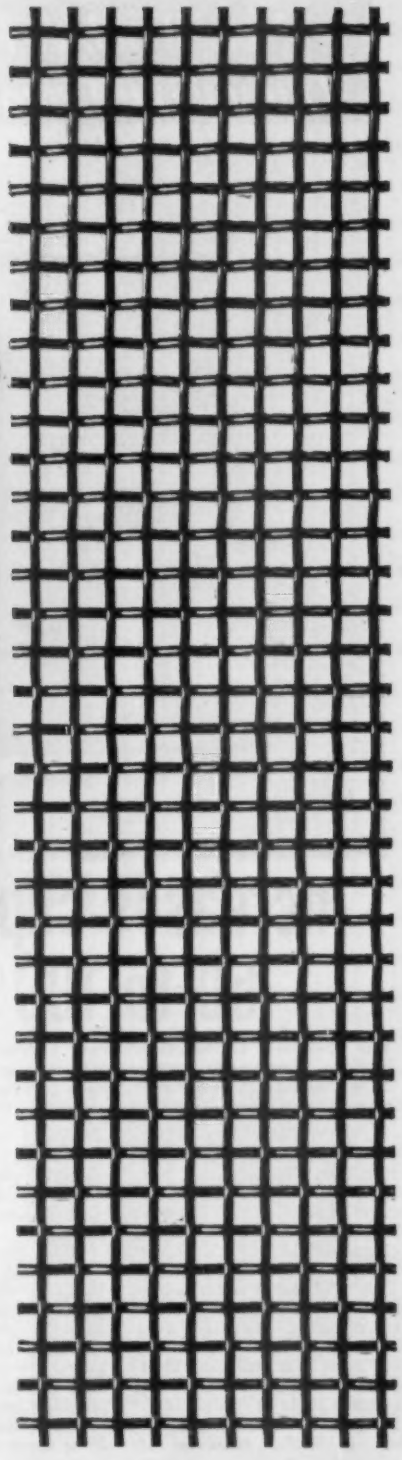


Tyler can supply all types of wire cloth — and screen sections fabricated to fit every existing type of vibrating screen.

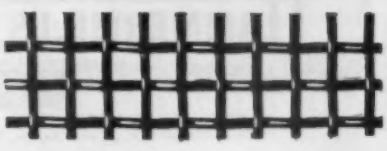
Tyler does more than manufacture 53,000 different specifications of wire cloth. It starts by designing the specifications to solve each problem to your greatest profit.

Selection and control of the metal is important—especially where corrosion, abrasion, or contamination are factors. Tyler controls the design of all metals and alloys used in weaving, and in addition operates its own wire mill for processing all its non-ferrous and many of its stainless steel wires. Tyler Screens are literally tailor-made for maximum profit to the user.

Ask your Tyler representative for full information—through him you'll get *Tyler Screening Service.*



TYLER

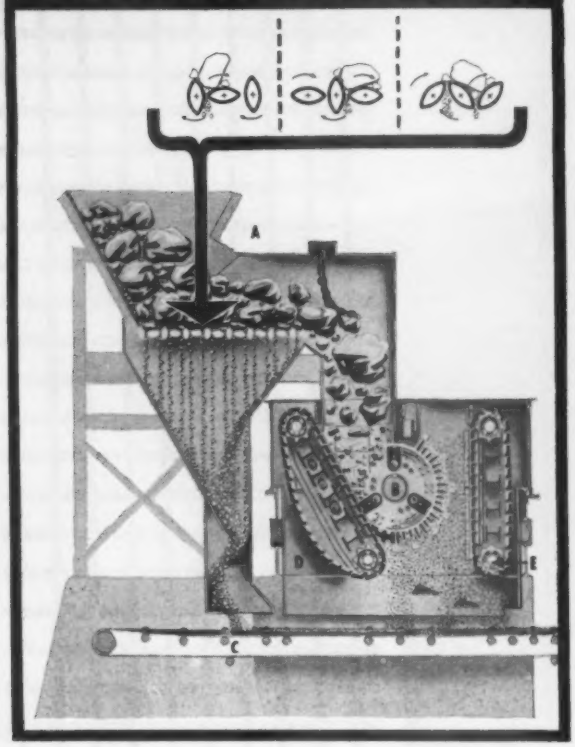


WOVEN WIRE SCREENS • SCREENING MACHINERY • TESTING SIEVE EQUIPMENT

The W. S. TYLER Company • *Cleveland 14, Ohio*

OFFICES: New York • Chicago • Boston • Philadelphia • Atlanta
Dallas • Los Angeles • San Francisco • Baltimore • Birmingham • Houston • Minneapolis
Pittsburgh • Salt Lake City • The W. S. Tyler Company of Canada, Limited,
St. Catharines, Ontario • OFFICE: Montreal

New Wobbler Feeder-Hammermill combination



Increases capacity 50 to 100%

The exclusive Universal Wobbler Feeder (patented) and Bulldog Hammermill combination was engineered for one of the world's largest cement mills to average 600 tons per hour. It can increase *your* capacity up to 100%! Here's why.

The Wobbler Feeder (A) feeds the Bulldog Hammermill (B). Its tumbling, rocking motion sifts fines and clay through the bars to under conveyor (C). Only clean oversize rock is delivered to the Hammermill. The Wobbler Feeder scalps as it feeds without blinding or plugging, particularly valuable when wet, sticky material is a problem. Bulldog Hammermill's traveling breaker plate (D) and cleaning bar (E) eliminate build-up of sticky material in breaking chamber. Your crushing operation keeps going without clogging or jamming regardless of moisture present.

Since the Wobbler Feeder sends only oversize to the Bulldog Hammermill, the Bulldog can handle more material per day. Add this efficient, no-waste breaking power to the double, non-clog protection of this new combination and you can increase your production up to as much as 100%!

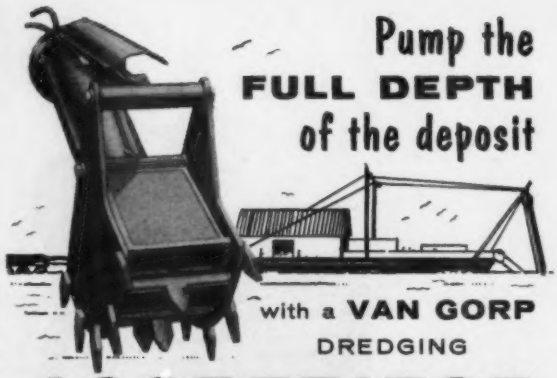
For the name of the Hammermill representative nearest you, write:

HAMMERMILLS, INC.

Subsidiary of PETTIBONE Mulliken Corp.

625 C Avenue N.W., Cedar Rapids, Iowa

Enter 168-A on card, page 145



Pump the FULL DEPTH of the deposit

with a **VAN GORP** DREDGING

AGGRETATOR

(SIZES AVAILABLE FOR 6-8-10-12 INCH SUCTION LINES)

- *Cuts through clay seams*
- *Loosens cemented deposits*
- *Dislodges large rocks*

No one knows how many tons of material are lost each year in dredging operations because of bad pumping conditions. However, we know that the use of a Van Gorp *Aggretator* has increased pumping time from 5 to 25%, depending on the deposit. We know too, that this increase in production usually pays for the cost of an *Aggretator* within a few months. It's easily installed, has a long productive life, and existing power is sufficient to drive the hydraulic pump. *Write* for details and illustrated brochure on 4 ways to increase your dredging production.

VAN gorp MFG., INC.

DEPT. PQ, PELLA, IOWA

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Winslow **TRUCK SCALES** *PIT AND PITLESS TYPES*

CABINET DIAL

Weight indication available includes ball bearing poise weighbeams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information PHONE NORTH 1231

TYPE CS—PORTABLE—PITLESS

Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18' x 9' thru 50' x 10', wood or steel deck.

TYPE S—PIT SCALE

Type S scales, pit installations, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform sizes 22' x 9' thru 60' x 10' for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.

4830 NORTH 25TH ST. TERRE HAUTE, IND.

Enter 168-C on card, page 145

Portable Lima Austin-Western 101-SE crushing plant spews pit-run stone and gravel into mobile surge bin.

Lima A-W Portable Crushers deliver

RELIABLE HIGH OUTPUT!

Designed and built for high output under *rugged* operating conditions, this portable Lima Austin-Western crushing plant is *ready* to pick up and go on a moment's notice. It belongs to the Williams Brothers Asphalt Paving Company, Ionia, Mich.

Reduced tonnage costs

They say, "It's a reliable high-output mobile rig that's been doing a very dependable job for us in widely separated locations throughout southern Michigan.

"It's not a complicated piece of equipment. Only minimum maintenance has been required. It's easy to adjust to meet a wide range of rigid specifications in pit or quarry work. We find that the outfit's one man, central control also helps us to reduce costs per ton."

The 101-SE is a completely portable, self-contained unit designed and built for rapid transport from job to job. High-speed production of construction materials near the job greatly reduces hauling time and costs.

Maintenance reduced

Diesel power operates crushers and electric generator; all other operations are electric. Simplicity of transmission eliminates troublesome clutches, chains, sprockets and gearboxes . . . reduces maintenance, increases tonnage profits.

There's a portable or stationary Lima Austin-Western crushing and screening plant just right for your needs. Investigate—see your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Stationary installation—Lima A-W line includes jaw and roll crushers, matching screens, elevators, conveyors and bins.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment

BALDWIN · LIMA · HAMILTON

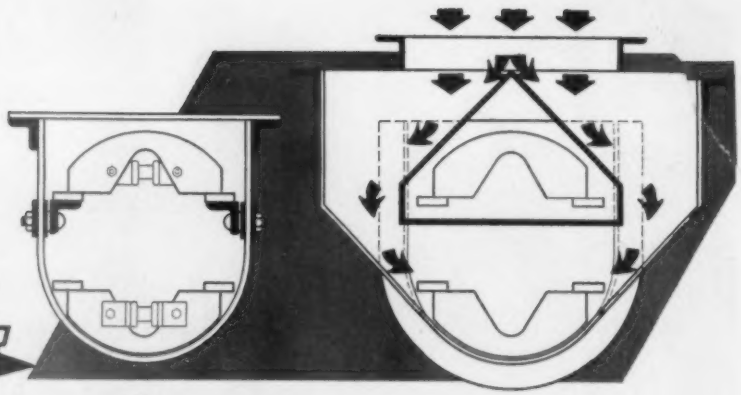
CONSTRUCTION EQUIPMENT DIVISION · LIMA, OHIO

6015

EHRSAM OFFERS

more than

"JUST A CONVEYOR"...



EHRSAM

DRACON...first

FIELD TESTED AND PROVEN SELF-CLEANING FLIGHT CONVEYOR

The DRACON chain-and-flight conveyor is proving to be the answer to many a tough conveying problem. This highly versatile conveyor is self-cleaning, compact, requires little maintenance, has a low horsepower/capacity ratio, and is economical to buy and operate.

Continuous field testing and engineering research since the pilot model was introduced in 1949 have put the DRACON at the top of the class. Outstanding flight quality has been achieved by thousands of hours of grueling testing of various materials and contours.

For more information on how the DRACON conveyor can handle your conveying work more efficiently and economically, see your Ehrsam representative or write for our free DRACON brochure.

The J. B. Ehrsam & Sons Mfg. Co.
ENTERPRISE • KANSAS

BRANCH OFFICES: ATLANTA, GEORGIA; CHICAGO, ILLINOIS; DENVER, COLORADO; DES MOINES, IOWA; FORT WORTH, TEXAS; HASTINGS, NEBRASKA; KANSAS CITY, KANSAS; PHILADELPHIA, PENNSYLVANIA; PHOENIX, ARIZONA; SAN FRANCISCO, CALIFORNIA.

Enter 170-A on card, page 145

ONLY CROSBY-LAUGHLIN SHACKLES

SAY WHAT THEY DO
DO WHAT THEY SAY!

Load-Rated®

GUARANTEED CAPACITIES
SIZE FOR SIZE—UNEQUALLED!

Ask your distributor for catalog on the complete line

CROSBY-LAUGHLIN *Division*
FT. WAYNE, INDIANA
Forged fittings for wire rope and chain

INDUSTRIAL DISTRIBUTORS — THE RIGHT HAND OF PRODUCTION

Enter 170-B on card, page 145

A SPARK CAN BE A DEADLY MISSILE

Such a little bit of carelessness can cause such a great amount of damage.

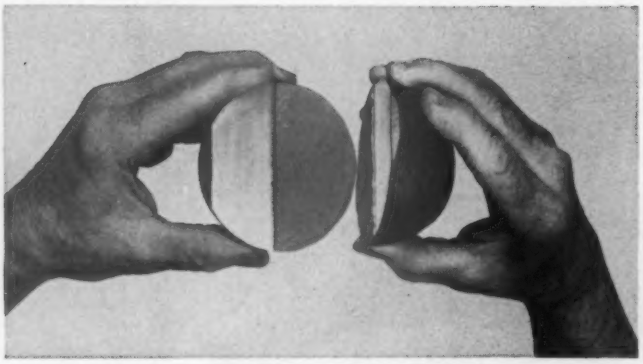
Loss of life, loss of vacation lands, loss of timber and watersheds can result from one cigarette thoughtlessly flipped from a car window, or one burning match dropped beside the road.

During these fire hazard months, a spark of any kind can be a deadly missile. And every year, our forest areas become more and more vital to the nation's welfare.

So be extra careful this year. Use your car ash tray. Douse your campfires. Be sure all fires are out, dead out. Be sure *you* don't cause a shameful forest fire. (Every year, some people do. 9 out of 10 forest fires are still man-caused.)

Remember Only You Can... PREVENT FOREST FIRES!

Like other American business firms, we believe that business has a responsibility to contribute to the public welfare. This advertisement is therefore sponsored in cooperation with The Advertising Council and U. S. and State Forest Service



SHEFFIELD
ARMCO
MOLY-COP
COPPER-MOLYBDENUM-ALLOY
Grinding Balls

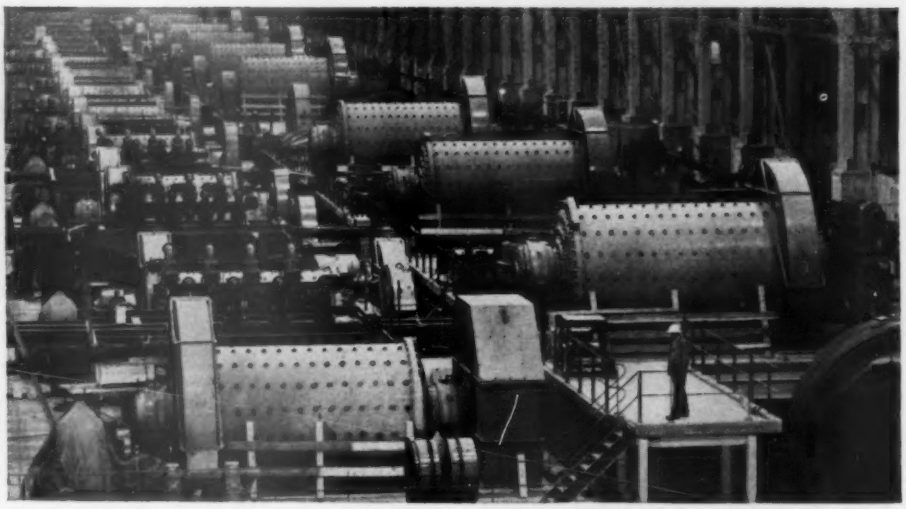
consistently

UNIFORM

for the long grind

New steels are born at Armco

Moly-Cop Balls perform superbly on the toughest grinding jobs because they have the hardness to fight surface wear; the toughness to resist spalling and breaking; plus uniformity that extends right to the core. They keep their roundness longer. Just a few of the reasons why Moly-Cop Grinding Balls are your most economical choice for the long grind.



The Standard of Comparison Around the World

SHEFFIELD DIVISION

Sheffield Plants: Kansas City, Houston, Tulsa

ARMCO STEEL CORPORATION

OTHER DIVISIONS AND SUBSIDIARIES: Armco Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

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PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

AUGUST 1960

BROADCAST

Section

Experienced Manager

Desires Supervisory Position in Sand & Gravel Industry.

Write to:

Box No. PQ-380-H, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

Graduate Mining Engineer, aged 34, married, desires production or management position. Nine years experience management, quarrying, construction and exploration. Primary considerations opportunity and responsibility. Will consider any location in U. S. Excellent references.

Box No. PQ-379-H, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED
KILN FOREMAN

for rotary kiln nodulizing plant. Must be capable of handling full supervision of plant including personnel and operation of kiln. Strong knowledge of equipment and strong mechanical background and kiln burning experience are necessary. Give full details on background. Replies confidential.

P. O. Box 1637
Newport News, Va.

POSITION WANTED

Aggressive Civil Engineer, age 30, married, eight years experience in design, construction, and maintenance of basic acids, lime, and Dolomite plants desires responsible position in above or associated fields.

Box No. PQ-382-H, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED

Civil Engineer, age 25 to 40. Must have had some practical experience. Material knowledge would be very helpful. Must be able to be away from home part time. Working throughout the State of Ohio.

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300 to 330 feet long by about 10 to 11½ feet diameter, with coal mill and with drive and with or without motor, starter, etc.

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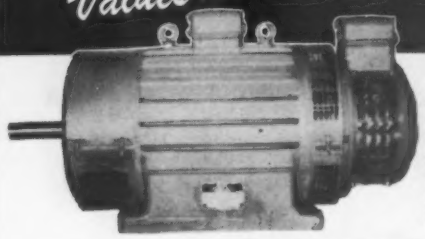

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Rotating armature design, self-excited, self-regulating.

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1—Portable 30 x 42 Universal Jaw Crusher with Feeder and Under Conveyor.

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Murphy diesel engine, electric starting equipment. Fair shape. F.O.B. Hollywood, New Mexico $25,000.00

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Junior Tandem Crusher, 10"x 24" Jaw, 16"x 24" rolls, 3x8 double deck screen I-H PA-100 gasoline power unit, tandem axle trailer mounted.

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We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1136.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

8" JR. I BEAM CONVEYOR PRICES

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1425	$ 766	
14"	50'	2266	1181	$16.62
14"	85'	3445	1763	
16"	20'	1287	700	
16"	45'	2180	1128	
16"	60'	2715	1384	$17.10
16"	90'	3786	1897	
18"	25'	1507	830	
18"	45'	2281	1180	
18"	70'	3205	1641	
18"	85'	3771	1912	$18.03
18"	100'	4337	2182	
18"	130'	5469	2723	
20"	25'	1547	871	
20"	60'	2940	1546	
20"	75'	3536	1836	$19.30
20"	90'	4133	2125	
24"	25'	1622	922	
24"	45'	2479	1335	
24"	70'	3550	1852	$20.68
24"	100'	4835	2479	
24"	120'	5692	2886	
24"	150'	6977	3507	
30"	50'	2969	1581	
30"	70'	3948	2054	$23.17
30"	90'	4928	2518	
36"	25'	1854	1105	
36"	45'	2915	1623	$25.91
36"	60'	3711	2012	
36"	100'	5832	3048	

Other lengths and belt widths priced upon application.

BONDED 30" DEEP TRUSS CONVEYORS also built in heavy duty Portable Models. Available with Screen and Feeder and with mast or mastless type undercarriage and hydraulic powered mechanism. Lengths to 60 feet and belt widths through 30 inches. Equipped with Tow Hitch for easy moving from one job-site to another.

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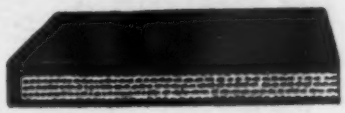

MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty, 28 oz. duck. ⅛" top x 1/32" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	Domestic Belt Per Foot
14"	4	$2.94
16"	4	3.09
18"	4	3.42
20"	4	3.95
24"	4	4.43
30"	4	5.42
36"	4	6.43

MAJOR C-BEE BRAND: SMOOTH SURFACE: 15# to 17# Friction Pull. 1600# to 2400# Cover Tensile. 28 oz. duck. Skim coat between plies. Heavy Duty belt for severe service and abrasion resistance.

Width	Ply	Top Cover	Bottom Cover	Imported Belt Per Foot
16"	4	1/8"	1/32"	3.12
18"	4	1/8"	1/32"	3.44
20"	4	1/8"	1/32"	3.97
24"	4	1/8"	1/32"	4.46
30"	4	1/8"	1/32"	5.56
36"	4	1/8"	1/32"	6.45
The Following Belts Are 32 Oz. Duck, 5 Ply:				
24"	5	1/8"	1/16"	$5.33
30"	5	1/8"	1/16"	6.59
36"	5	3/16"	1/16"	8.45

MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty 28 oz. duck, ⅛" top x 1/32" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	Domestic Belt Per Foot	Imported Belt Per Foot
16"	4	3.60	3.14
18"	4	3.98	3.47
20"	4	4.54	3.99
24"	4	5.14	4.50
30"	4	6.31	5.58
24"	5	6.01	5.25

MAJOR B-X SMOOTH SURFACE: 20# to 24# Friction Pull. 3400# to 4000# Cover Tensile. A heavier duty belt with ⅛" top x 1/32" bottom covers. For higher abrasion resistance and handling of materials where more strength is required.

Width	Ply	Domestic Belt Per Foot	Imported Belt Per Foot
16"	4	$3.93	$3.31
20"	4	4.98	4.02
30"	4	6.92	5.80

*** All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

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50# Steel Test Weights with Steel T Handle, **$11.00** each.

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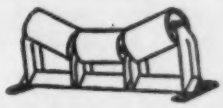

3-roll, 5" diameter Troughing Idlers for:			
14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50
1-roll, 5" diameter Return Rolls for:			
14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

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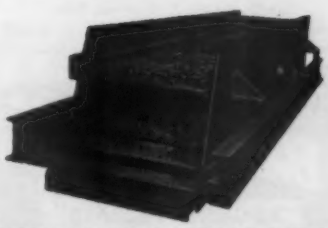

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HOISTS: One single drum, 8' dia., 60" face, 700 H.P. Also One double drum, 10' dia., 10' face, 1250 H.P., 1200 FPM, 1⅛" rope. Both above with 2200 volt, 3 phase, 60 cycle motors and controls.

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DRYERS: One 5' dia. x 25 ft. and one 3' dia. x 34 ft.

KILN: Rotary 4½ ft. dia. x 40 ft. with rotoclone and 7½ H.P. motor, 3 H.P. motor and speed reducer, classifier, kiln burner, etc.

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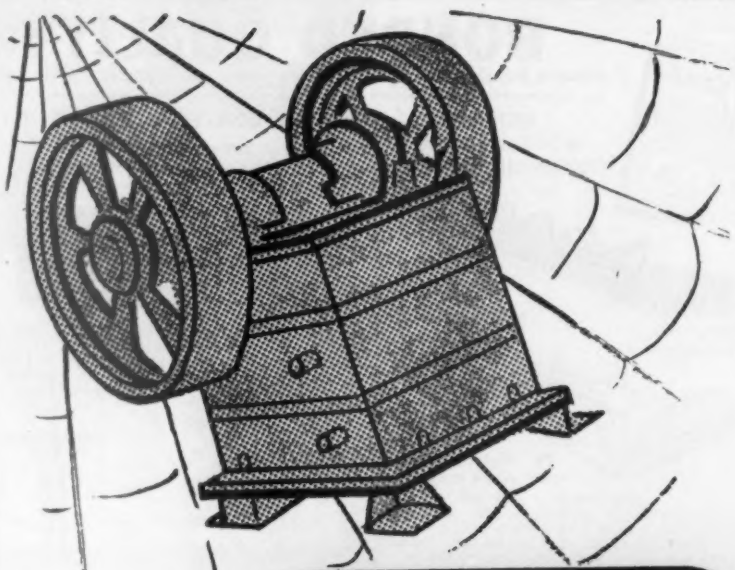

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Jaw Crusher—24 x 36 or 30 x 40. With or Without Feeder.

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Totally enclosed motors, gear reducers, electric starters to 100 hp. capacitors, sprockets, roller chain, couplings, V belts, blowers, etc.

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5—Jaw Crushers 12" x 18" to 36" x 48".
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3—18 Ton Plymouth Gas Locomotives
1—D-7 & D-8 Caterpillar Tractors
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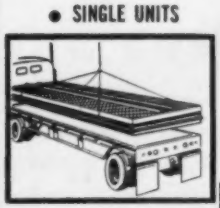

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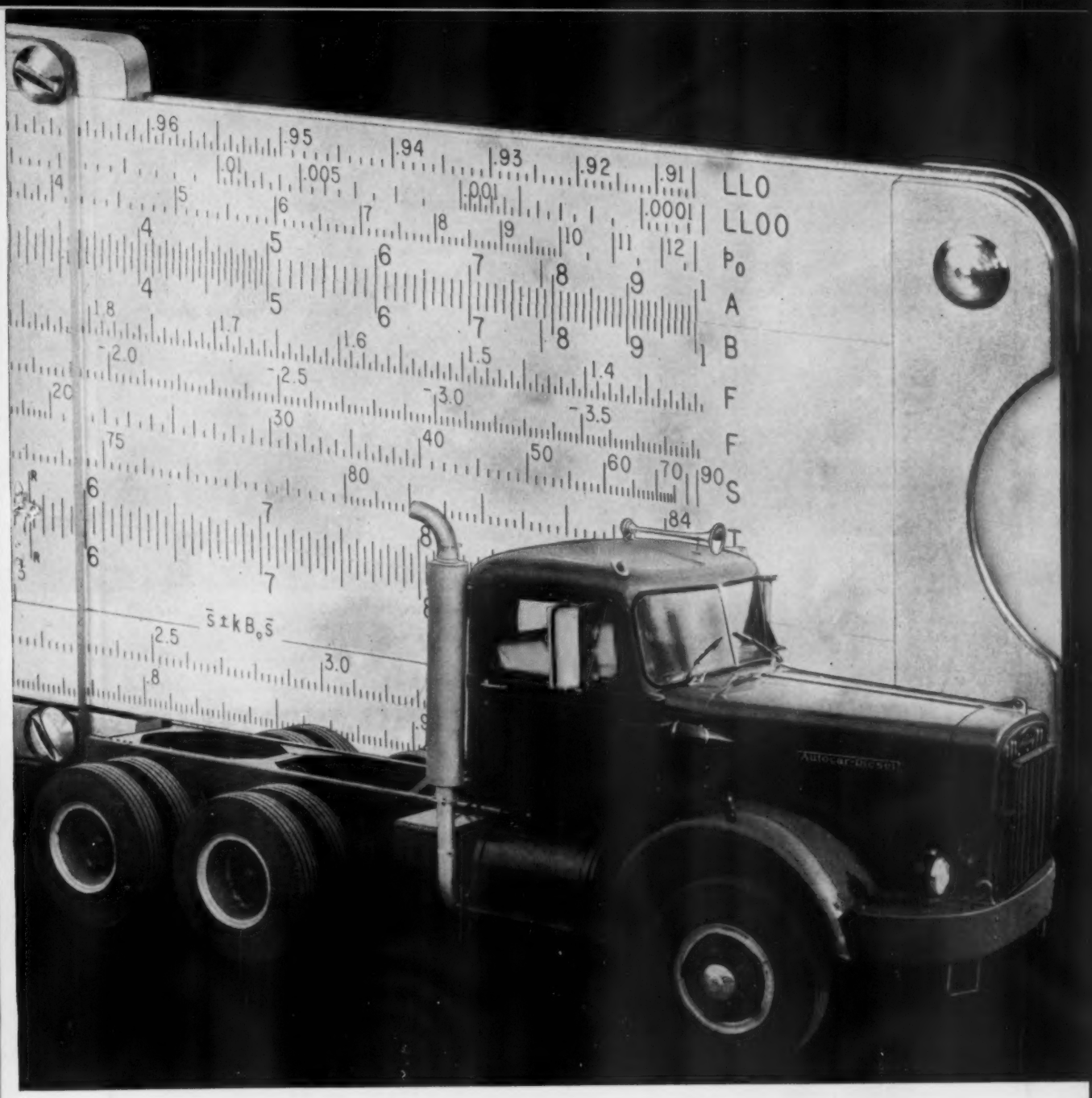

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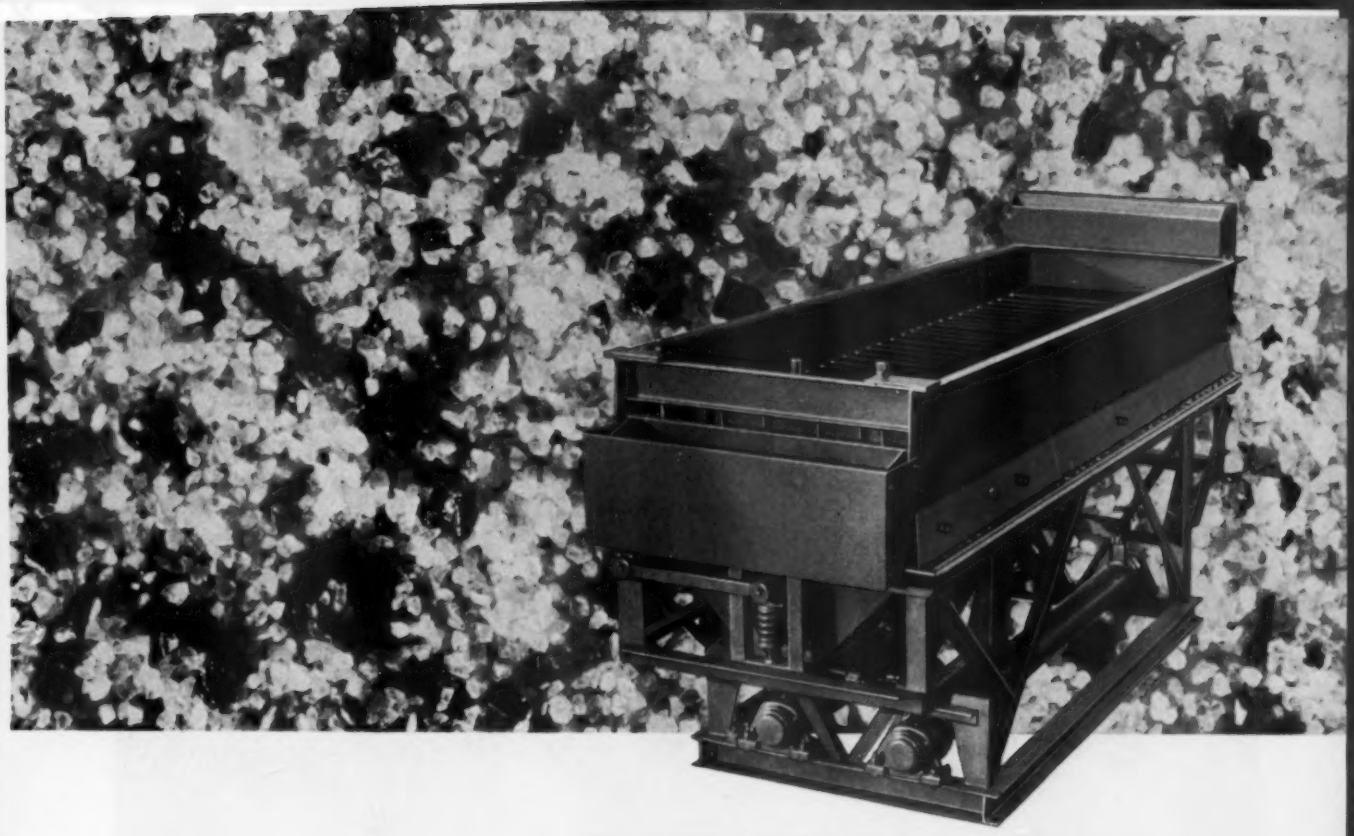

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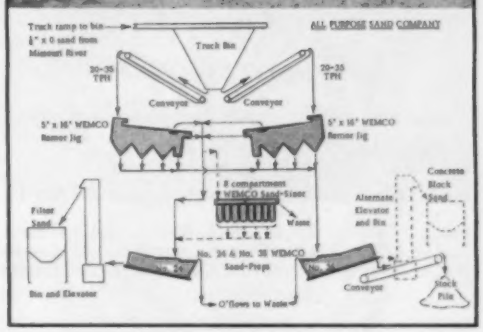

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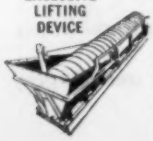

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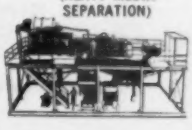

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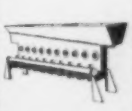

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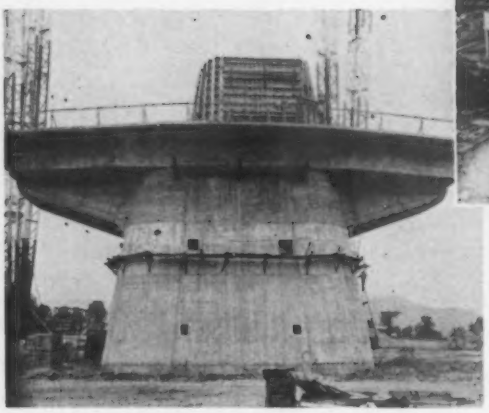

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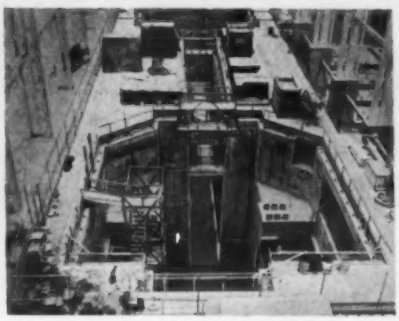

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